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PHEGEA

First sightings of the southern small white *Pieris mannii* (Lepidoptera: Pieridae) in the Low Countries

Pieter Vantieghem

Abstract. The first records of southern small white *Pieris mannii* (Mayer, 1851) for the Netherlands and Belgium in 2015, 2016 and 2017 are reviewed. An overview of the range expansion is given and the possible ecological triggers of this expansion are discussed. The possibility of historical presence of the species in Belgium is examined as well as the future of the species in the Low Countries.

Samenvatting. De eerste waarnemingen van het scheefbloemwitje *Pieris mannii* (Mayer, 1851) voor Nederland en België in 2015, 2016 en 2017 worden besproken. Er wordt ingegaan op de recente sterke areaaluitbreiding van de soort en de ecologische oorzaken ervan. Het mogelijk historisch voorkomen in België wordt nagegaan alsook de potentiële toekomst van de soort in de Lage Landen.

Résumé. Les premières mentions de la piéride de l'ibéride *Pieris mannii* (Mayer, 1851) pour Les Pays-Bas et la Belgique en 2015, 2016 et 2017 sont discutées. Un abrégé de l'expansion de la distribution de l'espèce est donné et les causes écologiques potentielles sont commentées. La possibilité de la présence historique de l'espèce est examinée ainsi que le futur de l'espèce aux Pays-Bas et en Belgique.

Key words. *Pieris mannii* – dispersion – range expansion – climate – Belgium – The Netherlands.

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Introduction

On 27.ix.2015 the author discovered a female of the southern small white, *Pieris mannii* (Mayer, 1851) on the Sint-Pietersberg near Maastricht (Limburg, the Netherlands). This was the first report of this species for the Netherlands. After this sighting was communicated, many Dutch observers re-examined their recent pictures of *Pieris* species and at least one earlier record became known. On 22.vii.2015 Marlie Huskens photographed a female *P. mannii* in her garden at Posterholt (Limburg, the Netherlands) (Van Swaay *et al*. 2016). It was not until the summer of 2016 that another specimen was recorded in the Low Countries. On 13.vii.2016, Jacky Poncin photographed a *Pieris* species in his garden in Wardin (Luxemburg, Belgium), which he initially identified as a large white, *Pieris brassicae* (Linnaeus, 1758). After uploading the pictures to the online nature observation platform, waarnemingen.be, Bram Omon was the first to note that this record, in fact, constituted the first Belgian record of *P. mannii*.

From September 2016 onwards, the autumnal generation of *P. mannii* appeared to be locally common at several locations in Dutch Limburg. Intensive monitoring of potential locations in the region by, among others, Paul Vossen revealed the species to be widespread in the whole south of Dutch Limburg. After the first Dutch sightings in September 2016 the author searched along the Belgian side of the border and on 17.ix.2016 multiple individuals of *P. mannii* could be caught and photographed in Teuven (Limburg, Belgium) (Fig. 1). Further research showed the species to be present at several other locations in the Voeren region (Limburg, Belgium) and nearby locations in the province of Liège (Belgium). Invariably, all sightings were made in gardens. On both sides of the Dutch-Belgian border in Limburg immature stages were found (Figs 2–3), each time on the widespread ornamental plant *Iberis sempervirens* L. An overview of the different Dutch and Belgian sightings is given in Fig. 4. The difference in amount of datapoints between the Netherlands and Belgium is largely caused by the difference in observer coverage between both regions.

Fig. 1. *P. mannii alpigena*, Teuven (Limburg, Belgium), 17.ix.2016, ♀.

Geographical distribution in evolution

Until early this century *P. mannii* was considered to be mainly a Mediterranean species. A large amount of subspecies and forms have been described of which Ziegler & Eitschberger (1999) in their monograph on the species withhold nine subspecies. The taxonomic relationships between these subspecies are still partly unclear and the amount of clearly distinguishable subspecies may even be lower (Meineke 2015). The species is distributed from the eastern Pyrenees over southeastern France and the southern Alpine flanks, the Italian Peninsula and the Balkan further to eastern Turkey (Ziegler & Eitschberger 1999). More to the west the species is local on the Iberian Peninsula to southern Spain (García-Barros *et al*. 2004; García-Barros *et al.* 2013). In Morocco it is probably extinct (Tarrier 1995). More to the north a few small populations existed near the Slovakian-Hungarian border and in western France. The former,

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however, have probably gone extinct (Ziegler & Eitschberger 1999) while the latter have been considered extinct for a long time (Lafranchis *et al*. 2015, Hensle *et al*. 2016). An overview of the different subspecies is given in Table 1.

Fig. 2. Egg of *P. mannii alpigena* on *Iberis sempervirens*, Sint-Martens-Voeren (Limburg, Belgium), 18.ix.2016. The black head capsule of the larva can already be seen.

From 2005, and especially from 2008 on, *P. mannii* has been found north of the Alps in Switzerland by several observers (Ziegler 2009). Until then the species was only known from some small populations on calcareous and rocky south oriented slopes in the Rhône valley in Wallis, Switzerland (Lepidopterologen-Arbeitsgruppe 1987). Remarkably, the new locations did not match the natural habitat in Wallis. The new habitat seemed to consist mainly of rockeries and other types of inclining gardens in villages and small cities where the potential larval food plant *Iberis sempervirens* is present.

Fig. 3. 1st instar caterpillar of *P. mannii alpigena* on *Iberis sempervirens*, Teuven (Limburg, Belgium), 17.ix.2016. The black head capsule of the first two instars is a diagnostic feature when compared to *P. rapae*.

The 2008 invasion north of the Alps appeared to be more than a one-off event and in the following years the species expanded its range further north mainly following the Rhine valley and from there spreading west- and eastwards. Currently the species is known from north-eastern France and a large part of the southern half of Germany (Hensle & Seizmair 2016, Pähler 2016, Wiemers 2016). An overview of the first records per region in north-western Europe is given in Table 2.

Table 1: Overview of the geographical distribution of the different subspecies of *Pieris mannii* according to Ziegler & Eitschberger. Subspecies suspected to be extinct are marked with (†) (Ziegler & Eitschberger 1999).

Subspecies	Distribution
mannii (Mayer, 1851)	Balkan from Slovenia tot S Greece
haroldi Wyatt, 1952 (†)	Morocco, Atlas
roberti Eitschberger & Steiniger, 1973	SE and C Spain
alpigena Verity, 1911	Catalonia to the southern Alpine slopes, recently expanded its range northwards
andegava Delahaye, 1910	W France SE of Paris, recently discovered in NE France and GD Luxemburg
rossii Stefanelli, 1900	Italian peninsula
todaroana Pincitore-Marott, 1879	Sicily
reskovitsi Gozmany, 1968 (†)	Hungary & Slovakia, Bükk mountains
hethaea Pfeiffer, 1931	Turkey

Potential drivers of the range expansion

The phenomena of dispersion and migration have been well studied in the genus *Pieris* and some species have become model species in this kind of research (e.g. Gilbert 2005, Spieth *et al.* 2012). *P. mannii*, however, was long known as a local species and is described as “Standorttreu” in the older Swiss ecological literature (Lepidopterologen-Arbeitsgruppe 1987). Some examples, however, show that the potential for dispersion is present in the species. There are some older records (1960, 1994) of solitary *P. mannii* north of the known distribution in eastern France, however without follow-up records or indications of a long-term establishment (Essayan *et al.* 2012). On a longer time scale Ziegler (2009) points to the populations in Wallis. During the last ice ages these locations were covered with glaciers and therefore, without a potential for dispersion *P. mannii* would not have been able to reach them.

The same author examined if there was a possibility of accidental import in the north of Switzerland. This seemed highly unlikely as the larval food plants that were found to carry eggs of the species were cultivated locally (Ziegler 2009).

Therefore, climate change is often denoted as the main cause for this sudden range expansion. Longer and

more frequent periods of drought and heat in the Mediterranean area in the years preceding the start of the range expansion could have created moments when not enough larval food plants of good quality were present. This could have been a trigger for females of *P. mannii* to start dispersing (Ziegler 2009, Kratochwill 2011). This seems a valuable hypothesis for a single or repeated influx of migrants from the south but seems an insufficient explanation for the success of a strong northerly range expansion.

In addition it seems that the climate niche of *P. mannii* should include northwestern Europe only in a much later stage of climate change (Settele *et al*. 2008). The advanced stage of *P. mannii* on its predicted climate niche can possibly be explained by the broad grid that is used in large scale models like the Climatic Risk Atlas of Settele *et al*. (2008), whereas climatological factors for larval development are mainly important on a microscale (García-Barros *et al*. 2009). The recent observations mainly point to populations in gardens in villages and towns, a (semi-)urban environment. Here, microclimatic conditions such as temperature and humidity can be locally very different from the surrounding area. This is known as the urban heat island effect (New 2015). The effect is noticeable not only in larger urbanized areas but can play a role in moderately urbanized areas as well (Kaiser *et al*. 2016). As a result, effects of climate change can be more pronounced in such urbanized areas (Youngsteadt *et al*. 2015). Modelling of a distribution on a large scale could therefore miss the effect of changes in the climate niche of a species on a small scale. A thorough study comparing the larval habitats of *P. mannii* in the newly conquered areas to the larval habitat in the original distribution area has not been done yet. In addition, the possibility of an observer effect needs to be considered (Romo *et al*. 2006). While butterfly enthusiasts specifically search for the species in urban areas in the north, in the south the species could mainly be searched for in the more interesting natural habitats. This could create a bias in the data on habitat preference.

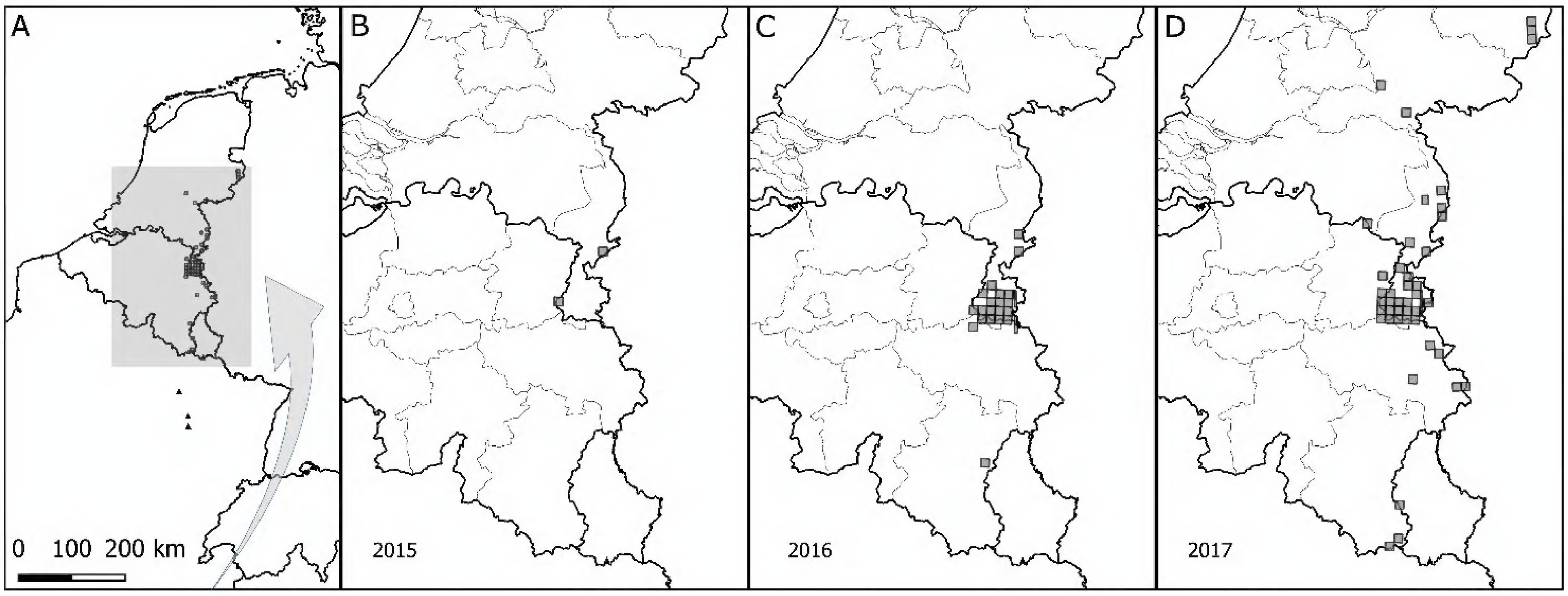

Fig. 4. Distribution (grid of 5 km UTM squares) of *P. mannii alpigena* in the Low Countries: Belgium & The Netherlands; **A**.– 5 km squares with all recent observations of *P. mannii alpigena* in the Low Countries, showing the position of the Low Countries in Northwestern Europe. The large grey rectangle shows the area of the details shown in parts B; C and D of the figure. The large grey arrow shows the main direction of the range expansion event. The small triangles show the position of the recently discovered populations of *P. mannii andegava* in northeastern France and the Grand Duchy of Luxembourg; **B**.– 5 km squares with observations of *P. mannii* in the Low Countries in 2015; **C**.– 5 km squares with observations of *P. mannii* in the Low Countries in 2016; **D**.– 5 km squares with observations of *P. mannii* in the Low Countries in 2017.

Small genetic changes can play a role as well in the sudden range expansion (Schulze 2016), especially the so-called spatial sorting. In spatial sorting a selection can arise in a species with an expanding range through space, at the dispersion front, rather than the well-known selection through time (Shine *et al*. 2011). A selection for the best disperser can in this way cause a cumulative effect and an acceleration of the observed range expansion. Such genetic changes have been described in other range expanding butterfly species (Mittika & Hanski 2010, Buckley *et al*. 2012). In a species like *P. mannii* with up to five generations per year, even in the north of the distribution (Schurian *et al*. 2016), such a selection can manifest itself rapidly and cause a swift range expansion. In Arthropods this can have an impact on several physical and behavioral conditions like speed of larval development, immunity and development of flight muscles (e.g. Therry *et al*. 2014). The presence of spatial sorting in the northern populations of *P. mannii* could thus be tested under laboratory conditions. In field conditions, however, it would be impossible to differentiate evolutionary effects from phenotypic plasticity of the species. Further research will have to show which of these effects have had an influence on the range expansion of *P. mannii* and to what extent.

Historical presence of *Pieris mannii* close to the Belgian border

The described range expansion of *P. mannii* finds its origin in the distribution of the western Mediterranean subspecies *P. mannii alpigena* Verity, 1911 (Table 1). However, recent discoveries have shown that the subspecies *P. mannii andegava* Delahaye, 1910, originally described from western France, is present as well in the valley of the river Meuse in north-eastern France and in

the extreme south of the Grand Duchy of Luxembourg (GDL), less than 20 km from the Belgian border (Fig. 5). In the GDL, the species has probably been present since at least the early 1970's (Goedert 2014, Schmidt-Koel 2014, Hensle *et al*. 2016). It seems likely that the species has always been overlooked because of the strong resemblance of the subspecies *andegava* to the abundant *Pieris rapae* (Linnaeus, 1758). The larval food plant at this location is *Iberis amara* L. This plant used to be widespread in the Belgian Gaume region and several river valleys in Wallonia before 1930. Later the number of locations declined strongly, mainly due to agricultural intensification, and nowadays the plant can only be found in one location in the valley of the Ourthe (Saintenoy-Simon 2006). Here, the population of the plant has recovered thanks to recent habitat restoration. The author looked for the presence of *P. mannii* at this location in the early autumn of 2015 but found only immature and adult stages of *P. rapae*. The wide distribution of the larval food plant before 1930, corresponding to the distribution in the south of the GDL may indicate that *P. mannii andegava* has been overlooked in Belgium as well. At this moment, however, there is no evidence of the (historical) presence of this subspecies in Belgium. It is advisable to check old collections for the presence of *P. mannii andegava*, as this may not have been done extensively yet.

Table 2: Overview of the first sightings per region in north-western Europe.

Year	Country	Region	Source
2001	France	Ain (Rhône-Alpes)	Bordon J. & Vernier R. 2003
2002	France	Jura (Franche-Comté)	Essayan *et al*. 2012
2005	Switzerland	Genf	Ziegler 2009
2006	Switzerland	Waadt	Ziegler 2009
2008	Switzerland	Bern	Ziegler 2009
		Luzern	Ziegler 2009
		Solothurn	Ziegler 2009
		Neuenburg	Ziegler 2009
		Basel	Ziegler 2009
		Freiburg	Ziegler 2009
		Jura	Ziegler 2009
		Aargau	Ziegler 2009
		Zurich	Ziegler 2009
	Germany	Freiburg (Badem-Württemberg)	Herrman 2008
2009	France	Haut-Rhin (Alsace)	Feldtrauer & Feldtrauer 2009
	Germany	Karlsruhe (Badem-Württemberg)	Herrman 2010
		Sigmaringen (Badem-Württemberg)	Herrman 2010
2010	Germany	Schwaben (Bayern)	Kratochwill 2011
	Austria	Voralberg	Kratochwill 2011
	France	Haut-Saône (Franche-Comté)	Essayan *et al*. 2012
2011	France	Côte d'Or (Bourgogne)	Essayan *et al*. 2012
		Bas-Rhin (Alsace)	Ochse & Schwab 2012
	Germany	Rheinland-Pfalz	Ochse & Schwab 2012
2012	Germany	Mittelfranken (Bayern)	Kostler 2012
		Nordwürttemberg (Badem-Württemberg)	Ekkehard 2013
		Giessen (Hessen)	Schurian & Siegel 2016
	France	Meurthe-et-Moselle (Lorraine)	Schmidt-Koel 2014
2013	Germany	Saarland	Schmidt-Koel 2013
2014	France	Moselle (Lorraine)	Schmidt-Koel 2014
	Germany	Niedersachsen	Meineke 2015
2015	Germany	Kassel (Hessen)	Schurian & Siege, 2016
		Westfalen (Nordrhein-Westfalen)	Schulze 2016
	Netherlands	Limburg	Van Swaay *et al*. 2016
2016	Germany	Sachsen-Anhalt	Wiemers 2016
	Belgium	Limburg	Vantieghem 2018
		Luik	Vantieghem 2018
		Luxemburg	Vantieghem 2018
2017	The Netherlands	Gelderland, Overijssel	Vantieghem 2018

Meanwhile it seems that the expanding range of *P. mannii alpigena* has reached the locations of the small colonies of *P. mannii andegava* (Hensle *et al*. 2016). Most probably this will lead to mingling of both populations. Genetic mixing can in this way decrease the phenotypic distinctiveness of the local *P. mannii* and increased parasitoid pressure following the range expansion can give raise to higher mortality (Layberry *et al*. 2014).

Future in the Low Countries

In recently colonised areas there seems to be a pattern in which the first observations of *P. mannii* are of one or a few solitary individuals in late summer or early autumn while the next summer the species seems already present all over the region. *P. mannii* is therefore likely to become a permanent member of the Dutch and the Belgian butterfly fauna. Long-term settlement seems evident all along the eastern borders of Belgium and the Netherlands, from the Gaume region in the south to Overijssel in the north. Several butterfly species that recently have expanded their range, such as *Brenthis daphne* (Bergsträsser, 1780) and *Cupido argiades* (Pallas, 1771), seem to have difficulties to protrude further to the west (Cuvelier *et al.* 2011; Vliegenthart 2016) and, apart from the eastern border zones, never reach large parts of Flanders or the Netherlands.

Fig. 5. *P. mannii andegava*, Pagny-la-Blanche-Côte (Meuse, France), 30.vi.2016, ♀.

The sandy regions in the eastern part of Flanders and the south of the Netherlands and the contiguous agricultural areas in parts of Flanders and the Netherlands may still form a barrier to further dispersion to the west while the higher and cooler forests of the Ardennes prevent a penetration from the south. Influence of the humid Atlantic climate may play a role as well. It could well be however that *P. mannii* is the first species to break this pattern, as has been shown by the sightings of single wandering individuals at great distance of suitable habitat.

At this point reproduction in Belgium and the Netherlands has only been noted on the garden plant *Iberis sempervirens*. In Germany however, research has shown that to a lesser extent the ruderal plant *Diplotaxis tenuifolia* (L.) DC. is used for reproduction which allows the species to reproduce outside gardens (Schurian *et al.* 2016). Further research will have to show if this is the case in the Low Countries as well.

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Caloptilia honoratella (Lepidoptera: Gracillariidae) een nieuwe soort voor de Belgische fauna

Willy De Prins, Chris Steeman & M. Jacobs

Samenvatting. Op 04 juni 2006 werd het eerste Belgische exemplaar van *Caloptilia honoratella* (Rebel, 1914) verzameld te Kinrooi (LI), gevolgd door een tweede ex. op 10 april 2017 te Kapellen (AN). Deze soort wordt hier voor het eerst uit België vermeld. Ze leeft bij ons uitsluitend op *Acer pseudoplatanus*. De Belgische vindplaatsen liggen op de noordwestgrens van het areaal.

Abstract. The first Belgian specimen of *Caloptilia honoratella* (Rebel, 1914) was caught on 04 June 2006 at Kinrooi (Limburg), followed by the second one on 10 April 2017 at Kapellen (Antwerp). This species is mentioned here for the first time from the Belgian fauna. The caterpillar lives exclusively on *Acer pseudoplatanus*. Both Belgian localities lay on the northwest border of the species' areal.

Résumé. Le premier exemplaire belge de *Caloptilia honoratella* (Rebel, 1914) a été capturé à Kinrooi (LI) le 04 juin 2006, suivi par le deuxième à Kapellen (AN) le 10 avril 2017. Cette espèce est mentionnée ici pour la première fois de Belgique. Elle vit exclusivement sur *Acer pseudoplatanus*. Les localités belges se trouvent à la limite nord-ouest de la zone de répartition de cette espèce.

Key words: *Caloptilia honoratella – hemidactylella – rufipennella – Acer pseudoplatanus* – Faunistics – Distribituion – First record – Belgium.

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Inleiding

Op 04 juni 2006 verzamelde de derde auteur een *Caloptilia*-exemplaar in het Stamprooiersbroek te Kinrooi (LI). Het is een redelijk afgevlogen exemplaar en het werd aanvankelijk als *Caloptilia hemidactylella* (Denis & Schiffermüller, 1775), bonte esdoornsteltmot, gedetermineerd door de eerste auteur en in diens referentiecollectie gedeponeerd. Het werd tevens onder die naam afgebeeld op de Gracillariidae website (De Prins & De Prins 2017). Marcel Prick maakte de eerste auteur opmerkzaam op het feit dat dit afgebeelde exemplaar (Fig. 1) wel eens de door hem voor Nederland ontdekte *Caloptilia honoratella* (Rebel, 1914) zou kunnen zijn. Dat bleek inderdaad het geval en intussen werd de Gracillariidae website aangepast. Een tweede exemplaar van deze bleke esdoornsteltmot raakte op 10 april 2017 bekend toen de tweede auteur een exemplaar in de dorpskern van Kapellen (AN) fotografeerde (det. T. Muus) (Fig. 2). Met deze nieuwe soort voor de Belgische fauna komt het aantal *Caloptilia*-soorten op 15 te staan en het aantal Gracillaridae op 103 (De Prins 2016).

Figuren 1–2. *Caloptilia honoratella* (Rebel, 1914); 1.– Kinrooi, Stamprooiersbroek, Limburg, 04.vi.2006, leg. M. Jacobs, © J. De Prins; 2.– Kapellen, Antwerpen, 10.iv.2017, leg. C. Steeman, © C. Steeman.

Hoewel verse en goed getekende exemplaren van zowel *C. honoratella* als *C. hemidactylella* met redelijke zekerheid van elkaar te onderscheiden zijn door kleine verschillen in de tekening van de voorvleugels, is genitaalonderzoek toch nodig als het gaat om afgevlogen exemplaren. Over het algemeen is de gele voorrandsvlek bij *C. honoratella* zowel basaal als distaal afgezet met heel donkerbruine schubben. Bij *C. hemidactylella* is de begrenzing van deze vlek veel minder duidelijk aangegeven. Goede uitleg over de genitaalverschillen, zowel mannetjes als vrouwtjes, vindt men bij Laštůvka & Laštůvka (2001) en bij Prick *et al*. (2017).

Biologie

C. honoratella leeft in de gematigde Europese streken op gewone esdoorn (*Acer pseudoplatanus*), in het Middellandse Zeegebied ook op *Acer monspessulanum*. Op gewone esdoorn kan men ook *C. hemidactylella* aantreffen, en verder *C. rufipennella* (Hübner, 1796), donkere esdoornsteltmot, een haast eenkleurig bruine soort en dus niet met beide andere soorten te verwarren. De bladmijnen en daaropvolgende kegels van de verschillende soorten zijn niet van elkaar te onderscheiden.

De soort heeft in Midden-Europa één generatie per jaar waarvan de vlinders in augustus beginnen te vliegen. De soort overwintert als adult en die adulten worden in het voorjaar weer actief. Beide Belgische exemplaren zijn dus overwinterde dieren. Bladmijnen moet men van begin juni tot einde juli zoeken. Met een beetje geluk kan men zelfs de pop aantreffen aan de onderkant van een esdoornblad (Ellis 2016, Rist & Stark 2012).

Verspreiding

De soort is oorspronkelijk beschreven uit Oostenrijk, maar het eigenlijke oorspronkelijke areaal van de soort ligt veel zuidelijker, nl. de drie grote schiereilanden van Europa: de Balkan, Italië en het Iberische schiereiland. Na de laatste ijstijd heeft de soort zich, samen met zijn voedselplanten naar Midden-Europa kunnen verspreiden (Prick *et al.* 2017: 244). *C. honoratella* wordt minder frequent waargenomen dan vele andere *Caloptilia*-soorten, maar dat kan te maken hebben met het feit dat deze soort zich zelden van haar voedselplant verwijdert en slechts sporadisch op licht komt. Beide Belgische vondsten duiden de huidige noordwestgrens aan van het areaal van deze soort.

C. honoratella is uitsluitend uit Europa bekend en wel uit volgende landen: Duitsland, Hongarije, Italië, Kroatië, Macedonië, Nederland, Oostenrijk, Spanje en Tsjechië (De Prins & De Prins 2017 en de referenties daarin).

Dankwoord

Wij danken de heer Marcel Prick om er ons op te wijzen dat het afgebeelde exemplaar op www.gracillariidae.net een *C. honoratella* is en om ons de eer te laten deze soort als nieuw voor de Belgische fauna te melden. Jurate De Prins zorgde voor de foto van het eerste Belgische exemplaar van deze soort, waarvoor dank. T. Muus wordt bedankt voor de determinatie van het exemplaar uit Kapellen.

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Summer Skippers and Butterflies from the Greek islands of Zákinthos (= Zante) and Kérkira (= Corfu), and a review of the hitherto known butterfly fauna of these two islands (Lepidoptera: Papilionoidea)

Nikos Ghavalas & John G. Coutsis

Abstract. Skipper and Butterfly records made by the first author on the Greek islands of Zákinthos and Kérkira are being listed together with those carried out by others. The sum-total of known, combined skipper and butterfly species for each one of these two islands is being presented and discussed.

Samenvatting. De dagvlinders waargenomen door de eerste auteur op de Griekse eilanden Zákinthos and Kérkira worden opgelijst, samen met waarnemingen door anderen. Het totaal aantal soorten dagvlinders voor elk van deze eilanden wordt voorgesteld en becommentarieerd.

Résumé. Les papillons qui ont été observés par le premier auteur sur les îles grecques de Zákinthos et Kérkira sont mentionnés, accompagnés des observations d'autre personnes. Une liste complète des papillons de ces deux îles est donnée et discutée.

Key words: Greece – Ionian Islands – Zákinthos – Kérkira – Lepidoptera – Papilionoidea – Zoogeography – Faunistics.

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Introduction

Our incomplete knowledge of the butterflies of the majority of the Greek islands in the Ionian Sea and the unreliability of some of the older butterfly records from these islands made it desirable to revisit these locations, starting with the islands of Zákinthos and Kérkira. The former was thus visited by the first author end June 2011 and the latter the first half of July 2016. The results are listed hereunder, as are also all available previous records carried out and published by others.

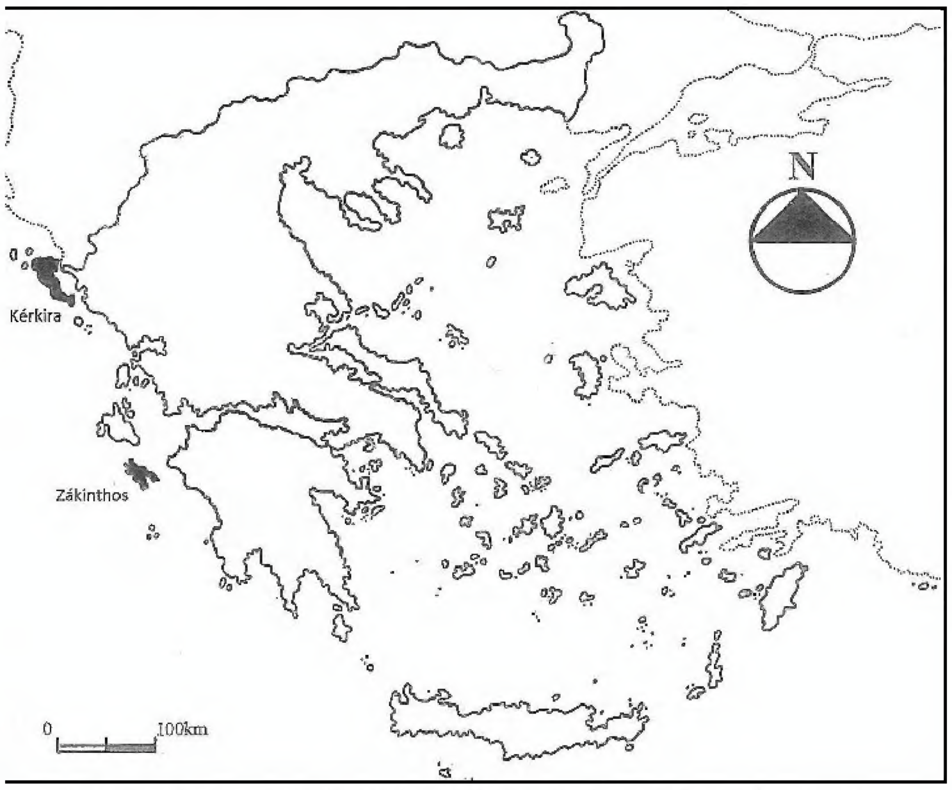

Fig. 1. Map of Greece with Kérkira and Zákinthos indicated in black.

Zákinthos Island 2011 (Maps: figs 1, 2)

Localities visited and dates of visit

Between Zákinthos town and Tsilivís, 50 m, 20.vi.
Vasilikós, 50 m, 25.vi.
Kiliómeno, 400 m, 21.vi.
Between Mariés and Anafonítria, 200 m, 23.vi.
Mt. Vrahiónas, 200–600 m, 23.vi.
Between Aghalás and Lithakiá, 250 m, 25.vi.

Fig. 2. Map of Zákinthos Island.

Two important personal records based on genitalia

Leptidea sinapis (Linnaeus, 1758). (Kiliómeno; between Mariés and Anafonítria; Mt. Vrahiónas; between Aghalás and Lithakiá). All captured specimens, both male and female, had their genitalia checked in order to make certain that no *L. juvernica* Williams, 1946 were included amongst them, and absolutely all, without exception, turned out to be by their appendages typical *L. sinapis*. As, however, most specimens had a somewhat yellowish upper side tinge, reminding one of *L. duponcheli* (Staudinger, 1871), and as the latter had indeed already been reported from Zákinthos by Koutsaftikis (1974b), Gaskin & Littler (1986), Tolman (1997) and Pamperis (2009), we also checked all our *Leptidea* specimens both in respect of their genitalia as well as by the shape of their

FW v1 vein and in both instances found all characters to be in line with those of typical of *L. sinapis*.

We therefore conclude that *L. duponcheli* is an erroneous record for Zákinthos and most probably for the whole of the Ionian Islands as well. From our experiences in the field we can tell with certainty that *L. duponcheli* in Greece does not extend to the south of Ípiros and the north of Thessalía, being absent from Stereá Ellás, Pelopónnisos and the Greek islands.

Other, previous records of *L. sinapis* from Zákinthos may also be found in: Koutsaftikis (1974b), Gaskin & Littler (1986), Tolman (1997), Embacher (2000), and Pamperis (2009).

Hipparchia volgensis (Mazochin-Porshnjakov, 1952). (Kiliómeno; Mt. Vrahiónas). All captured specimens were males, and found to be *H. volgensis* by their genitalic appendages (fig. 3). The species had already previously been recorded for the island by Gaskin & Littler (1986), Tolman (1997), Embacher (2000), and Pamperis (2009, as *Hipparchia delattini* Kudrna, 1975). We found no sign whatsoever of the existence there of *Hipparchia senthes* Fruhstorfer, 1908, previously recorded without genitalic evidence from other Ionian islands by Pamperis (2009 [Kérkira; Paxí; Lefkádha; Kefalloniá, the last three with a question-mark]). In fact our experience has shown that *H. senthes* is primarily found to the E. of the Píndhos range, in eastern Pelopónnisos, and on most Aegean Islands, whilst *H. volgensis* is to be met with primarily to the W. of the Píndhos range, in western Pelopónnisos, and on most of the Ionian Islands. This implies that the Pamperis records are most probably the result of photograph-deduced misidentifications.

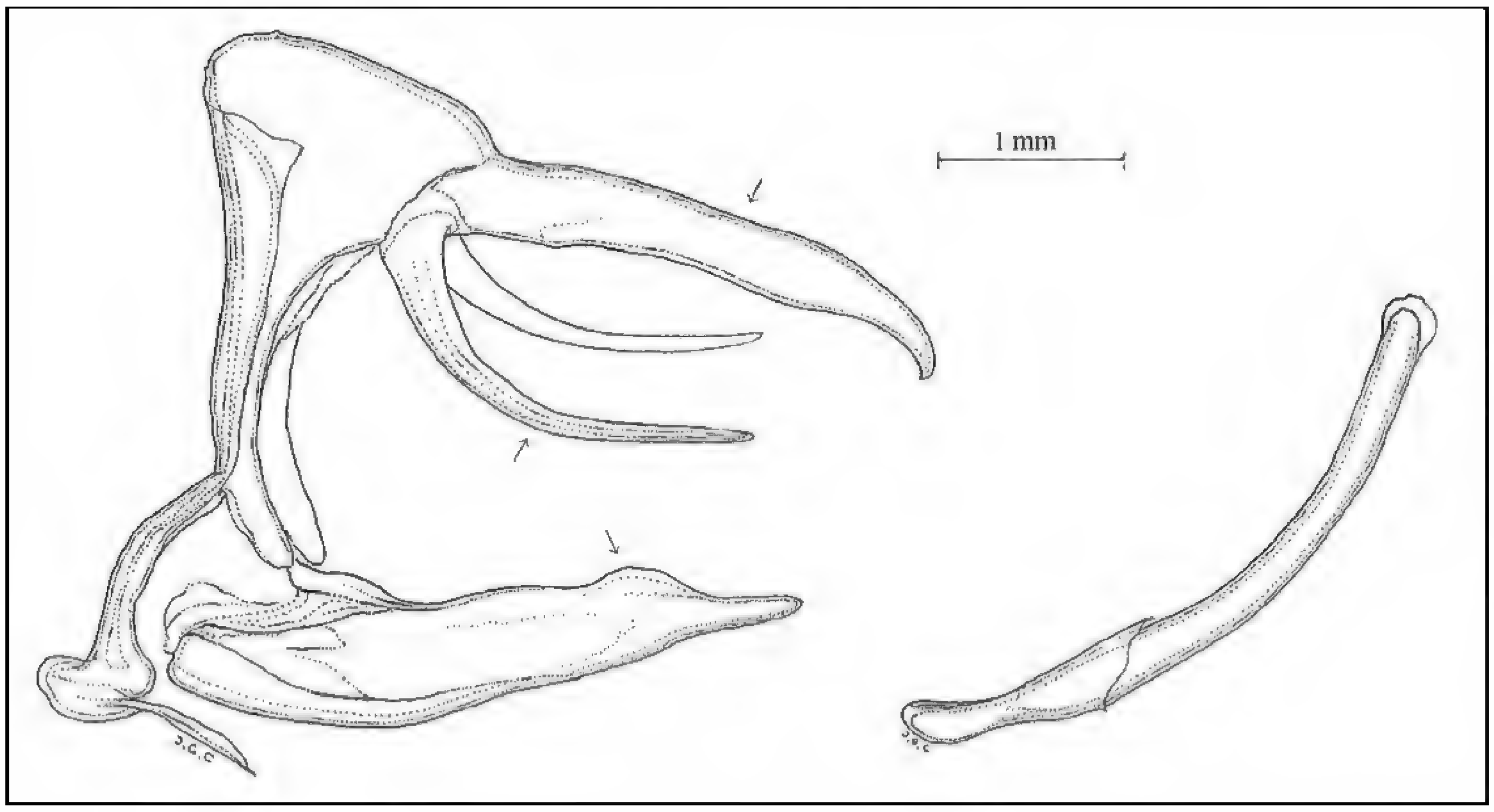

Fig. 3. Male genitalia of *Hipparchia volgensis* (Mazochin-Porshnjakov, 1952). Greece, Zákinthos Island, Kiliómeno, 400 m, 21.vi.2011, leg. N. Ghavalas, genitalia slide J. Coutsis 1750.

Other personal records

Carcharodus alceae (Esper, [1780]). (Mt. Vrahiónas; Kiliómeno). **New record**.

Spialia orbifer (Hübner, [1823]). (Mt. Vrahiónas). Previously also recorded by Gaskin & Littler (1986, as *Spialia sertorius orbifer*), Tolman (1997), Pamperis (2009).

Thymelicus acteon (Rottemburg, 1775). (Mt. Vrahiónas; Kiliómeno). Previously also recorded by Gaskin & Littler (1986), Pamperis (2009).

Papilio machaon Linnaeus, 1758. (Between Zákinthos town and Tsilivís; Vasilikós; Kiliómeno; between Mariés and Anafonítria; Mt. Vrahiónas; between Aghalás and Lithakiá). Previously also recorded by Pamperis (2009).

Iphiclides podalirius (Linnaeus, 1758). (Vasilikós; Kiliómeno; between Mariés and Anafonítria; Mt. Vrahiónas; between Aghalás and Lithakiá). Previously also recorded by Gaskin & Littler (1986), Pamperis (2009).

Pieris brassicae (Linnaeus, 1758). (Between Zákinthos town and Tsilivís; Vasilikós; Kiliómeno; between Mariés and Anafonítria; Mt. Vrahiónas; between Aghalás and Lithakiá). Previously also recorded by Gaskin & Littler (1986), Pamperis (2009).

Pieris rapae (Linnaeus, 1758). (Between Zákinthos town and Tsilivís; Vasilikós; Kiliómeno; between Mariés and Anafonítria; Mt. Vrahiónas; between Aghalás and Lithakiá). Previously also recorded by Koutsaftikis (1974b), Gaskin & Littler (1986), Pamperis (2009).

Pontia edusa (Fabricius, 1777). (Mt. Vrahiónas). **New record**.

Colias croceus (Fourcroy, 1785). (Between Zákinthos town and Tsilivís; Vasilikós; Kiliómeno; between Mariés and Anafonítria; Mt. Vrahiónas; between Aghalás and Lithakiá). Previously also recorded by Gaskin & Littler (1986, as *Colias crocea*), Pamperis (2009).

Gonepteryx cleopatra (Linnaeus, 1767). (Between Zákinthos town and Tsilivís; Vasilikós; Kiliómeno; between Mariés and Anafonítria; Mt. Vrahiónas; between Aghalás and Lithakiá). Previously also recorded by Gaskin & Littler (1986), Tolman (1997), Pamperis (2009).

Gonepteryx farinosa (Zeller, 1847). (Mt. Vrahiónas). Previously also recorded by Embacher (2000).

Satyrium spini ([Schiffermüller], 1775). (Mt. Vrahiónas). Previously also recorded by Gaskin & Littler (1986), Tolman (1997), Pamperis (2009).

Lycaena phlaeas (Linnaeus, 1761). (Vasilikós; Kiliómeno). Previously also recorded by Gaskin & Littler (1986), Pamperis (2009).

Leptotes pirithous (Linnaeus, 1767). (Between Aghalás and Lithakiá). **New record**.

Celastrina argiolus (Linnaeus, 1758). (Vasilikós). Previously also recorded by Gaskin & Littler (1986), Pamperis (2009).

Aricia agestis (Denis & Schiffermüller, 1775). (Mt. Vrahiónas). Previously also recorded by Gaskin & Littler (1986), Pamperis (2009).

Polyommatus icarus (Rottemburg, 1775). (Vasilikós; Kiliómeno; between Mariés and Anafonítria; Mt. Vrahiónas). Previously also recorded by Gaskin & Littler (1986), Pamperis (2009).

Maniola jurtina (Linnaeus, 1758). (Vasilikós; Kiliómeno; Mt. Vrahiónas; between Aghalás and Lithakiá). Previously also recorded by Gaskin & Littler (1986), Pamperis (2009).

Lasiommata megera (Linnaeus, 1767). (Vasilikós; Kiliómeno; Mt. Vrahiónas; between Aghalás and Lithakiá). Previously also recorded by Gaskin & Littler (1986), Pamperis (2009).

Lasiommata maera (Linnaeus, 1758). (Between Aghalás and Lithakiá). **New record**.

Charaxes jasius (Linnaeus, 1767). (Between Mariés and Anafonítria). Credit must be given to our Greek friend collector from Thessaloníki, Antony Mastorákis, for being the first person to discover this species in Zákinthos. **First published record**.

Limenitis reducta Staudinger, 1901. (Vasilikós; between Mariés and Anafonítria). Previously also recorded by Gaskin & Littler (1986), Tolman (1997), Pamperis (2009).

Vanessa atalanta (Linnaeus, 1758). (Vasilikós; Kiliómeno; between Mariés and Anafonítria). Previously also recorded by Gaskin & Littler (1986), Pamperis (2009).

Vanessa cardui (Linnaeus, 1758). (Vasilikós; Kiliómeno; Mt. Vrahiónas; between Aghalás and Lithakiá). Previously also recorded by Gaskin & Littler (1986, as *Cynthia cardui*), Pamperis (2009).

Polygonia egea (Cramer, [1775]). (Kiliómeno). Previously also recorded by Gaskin & Littler (1986), Pamperis (2009).

Records made exclusively by others

Ochlodes sylvanus (Esper, [1779]): Gaskin & Littler (1986, as *Ochlodes venatus* (Bremer & Grey, 1853)), Pamperis (2009).

Gegenes pumilio (Hoffmannsegg, 1804): Embacher (2000). Note: perhaps a misidentified *G. nostrodamus* (Fabricius, 1793). Confirmation by genitalia desirable.

Papilio alexanor Esper, [1800]: Pamperis (2009). Note: confirmation desirable.

Zerynthia polyxena (Denis & Schiffermüller, 1775): Pamperis (2009). Note: confirmation desirable.

Euchloe ausonia (Hübner, [1804]): Gaskin & Littler (1986), Pamperis (2009).

Gonepteryx rhamni (Linnaeus, 1758): Gaskin & Littler (1986), Tolman (1997), Pamperis (2009). Note: In our estimation this record is rather improbable and probably refers to misidentified *G. farinosa*. Confirmation desirable.

L. duponcheli: Koutsaftikis (1974b), Gaskin & Littler (1986), Tolman (1997), Pamperis (2009). Note: rejected by us as a valid record for reasons explained under *L. sinapis*.

Callophrys rubi (Linnaeus, 1758): Gaskin & Littler (1986), Pamperis (2009).

Lampides boeticus (Linnaeus, 1767): Gaskin & Littler (1986), Pamperis (2009).

Glaucopsyche alexis (Poda, 1761): Gaskin & Littler (1986), Pamperis (2009).

Pseudophilotes vicrama (Moore, 1865): Rebel (1910, as *Lycaena baton*), Gaskin & Littler (1986, as *Philotes baton* (Bergsträsser, 1779)), Pamperis (2009).

Hipparchia fatua Freyer, [1844]: Pamperis (2009). Note: confirmation desirable.

Coenonympha pamphilus (Linnaeus, 1758): Rebel (1910), Gaskin & Littler (1986), Pamperis (2009).

Pararge aegeria (Linnaeus, 1758): Pamperis (2009). Note: confirmation desirable.

Melitaea didyma (Esper, [1778]): Pamperis (2009). Note: confirmation desirable.

Kérkira 2016 (Maps: figs 1, 4)

Localities visited and dates of visit

Perivóli, 40 m, 4.vii.
Kérkira town, 20 m, 6.vii.
Mt. Prasúdhi, 200–400 m, 7.vii.
Korissíon Lagoon, 20 m, 7.vii.
Peruládhes, 40 m, 9.vii.
Kriniás, 200 m, 10.vii.
Trimódhi, 450 m, 10.vii.
Petália, 650 m, 10.vii.
Mt. Pandokrátor, 800–900 m, 10.vii.
Mt. Pandokrátor, N. side, 600 m, 10.vii.
Lútses, 240 m, 10.vii.
Almirós beach, 10 m, 11.vii.
Nímfes, 170 m, 12.vii.
Omalí, 360 m, 12.vii.
Epískepsi, 230 m, 12.vii.
Áyios Stéfanos Siníon, sea level, 13.vii.

Three important personal records based on genitalia

L. sinapis. (Perivóli; Mt. Prasúdhi; Peruládhes; Lútses; Nímfes; Epískepsi). By using the same procedures as for the Zákinthos material we identified all specimens as clear-cut *sinapis*. Previously also recorded by Staudinger (1870, as *Leptophasia sinapis*), Norris (1891, as *Leucophasia sinapis*), Mathew (1898, as *Leucophasia sinapis*), Fletcher (1901, as *Leptidia sinapis*), Rebel (1910, 1912, in both instances as *Leptidia sinapis*), Graves (1926b, as *Leptosia sinapis*), Galvagni (1934, as *Leptidia sinapis*), Baldock & Bretherton (1981), McLean (1983), Showler (1984), Olivier (1987b), Withrington (1995), Parker (1996), Tolman (1997), Pamperis (2009), Ghinis *et al*. (2013). We found no evidence of the existence there of any *L. duponcheli* and therefore conclude that previous records of it by Koutsaftikis (1974b) and Pamperis (2009)

are within all probability erroneous. Parker (1996) records *L. duponcheli* as erroneous or doubtful.

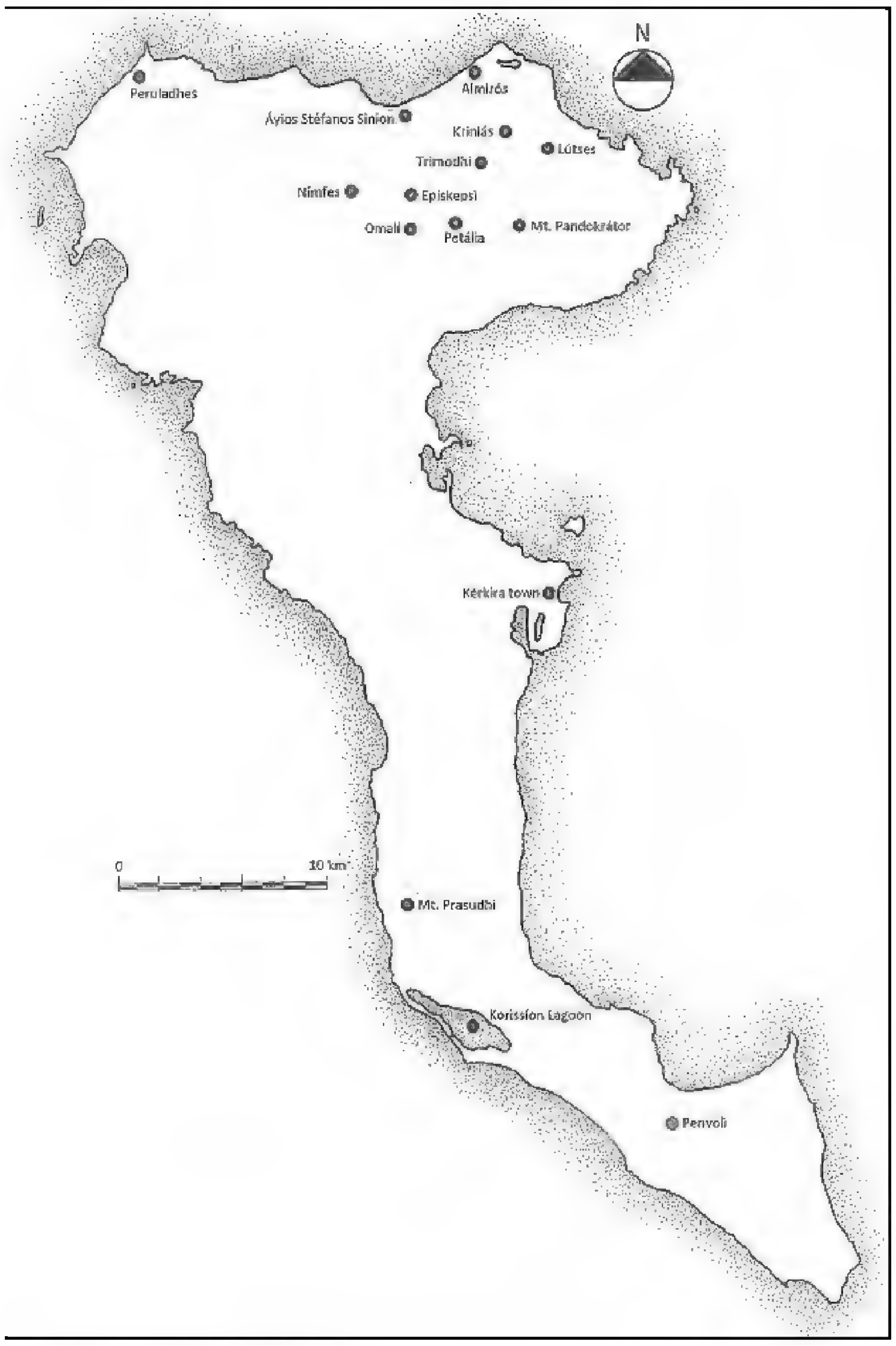

Fig. 4. Map of Kérkira Island.

H. volgensis. (Trimódhi; Epískepsi). A single male recorded from the first locality and a single female from the second one. Both identified as *H. volgensis* by genitalia, but only those of the male are figured here (Fig. 5). Previously also recorded by Parker (1996) and Pamperis (2009, as *Hipparchia delattini*). We found no sign of *H. senthes* amongst them and therefore conclude that previous records of it by Mathew (1898, as *Satyrus semele* var. *aristaeus* (Bonelli, 1826)), de la Garde (1899, as *Satyrus semele* var. *aristaeus*), Pamperis (2009), and Ghinis *et al.* (2013, as *Hipparchia aristaeus*) are erroneous. Previous records for the island of *Hipparchia semele* (Linnaeus, 1758) by Norris (1891, as *Satyrus semele*), Rebel (1910, as *Satyrus semele*), Graves (1926a, b), Haig-Thomas (1931), Galvagni (1935, as *Satyrus semele*) and Parker (1996) are also obviously erroneous, as *H. semele*, in its present sense, is totally absent from Greece as a whole.

H. syriaca (Staudinger, 1871). (Trimódhi; Petália; Mt. Pandokrátor; Mt. Pandokrátor, N. side; Lútses; Nímfes). All recorded specimens were males, with the exception of a single female from Lútses. Both genders identified as *H. syriaca* by genitalia, but only those of a male figured here (Fig. 6). Previously also recorded by Graves (1926a, b, in both instances as *Satyrus syriaca*), Haig-Thomas (1931, as *Satyrus syriaca*), Baldock & Bretherton (1981), Withrington (1995), Parker (1996), Tolman (1997), Pamperis (2009), and Ghinis *et al*. (2013). We were not able to find amongst our captures a single *Hipparchia fagi* (Scopoli, 1763) and therefore believe that previous records of it by Norris (1891, as *Satyrus hermione* (Linnaeus, 1764)), Mathew (1898, as *Satyrus hermione*), Rebel (1910, as *Satyrus hermione*), Baldock & Bretherton (1981), Tolman (1997), and Pamperis (2009) need confirmation through genitalic evidence. Note: a series of confirmed-by-genitalia *H. fagi* with provenance the closely located dry Ionian island of Lefkádha, and given to us by a Greek friend collector, agree with Tolman (1997), who reports this species from the same island, likewise having identified it by its genitalia. This suggests that *H. fagi* may possibly be present on other Ionian islands as well, including that of Kérkira.

Other personal records

C. alceae. (Mt. Pandokrátor; Mt. Pandokrátor, N. side; Lútses). Previously also recorded by Norris (1891, as *Spilothyrus alceae*), Mathew (1898, as *Spilothyrus alceae*), Graves (1926b, as *Erynnis alceae*), Galvagni (1935), Baldock & Bretherton (1981), Withrington (1995), Parker (1996), Pamperis (2009), Ghinis *et al*. (2013).

Muschampia proto (Ochsenheimer, 1808). (Mt. Pandokrátor, N. side). Previously also recorded by Mathew (1898, as *Syrichthus proto*), Baldock & Bretherton (1981, as *Syrichtus proto*), Parker (1996), Embacher (2000), Pamperis (2009), Ghinis et al. (2013).

Thymelicus sylvestris (Poda, 1761). (Trimódhi; Mt. Pandokrátor). Previously also recorded by Norris (1891, as *Hesperia thaumas*), Rebel (1912, as *Adopaea thaumas*), Graves (1926b, as *Adopaea flava*), Baldock & Bretherton (1981, as *Thymelicus flavus*), Parker (1996), Tolman (1997), Pamperis (2009), Ghinis *et al*. (2013; [in our estimation the two accompanying colour figures represent male *T. acteon*]).

P. machaon. (Mt. Prasúdhi; Peruládhes; Kriniás; Petália; Mt. Pandokrátor; Lútses; Almirós beach; Nímfes). Previously also recorded by Norris (1891), Mathew (1898), Rebel (1910), Graves (1926b), Haig-Thomas (1931), Galvagni (1934), Lipscomb (1977), Baldock & Bretherton (1981), Vanholder (1993), Withrington (1995), Parker (1996), Pamperis (2009), Ghinis et al. (2013).

I. podalirius. (Perivóli; Kérkira town; Mt. Prasúdhi; Peruládhes; Kriniás; Trimódhi; Petália; Mt. Pandokrátor; Mt. Pandokrátor, N. side; Almirós beach; Nímfes; Omalí; Epískepsi; Áyios Stéfanos Sinίon). Previously also recorded by Norris (1891, as *Papilio podalirius*), Mathew (1898, as *Papilio podalirius*), Rebel (1910, as *Papilio podalirius*), Graves (1926b), Haig-Thomas (1931, as *Papilio podalirius*), Galvagni (1934, as *Papilio podalirius*), Lipscomb (1977), Baldock & Bretherton (1981), Showler (1984), Olivier (1987b), Köstler (1991), Parker (1996), Pamperis (2009), Ghinis *et al*. (2013).

P. brassicae. (Perivóli; Mt. Prasúdhi; Trimódhi; Petália; Mt. Pandokrátor; Almirós beach; Nímfes; Omalí; Epískepsi). Previously also recorded by Staudinger (1870), Norris (1891), de la Garde (1899), Fletcher (1901), Rebel (1910, 1912), Graves (1926b), Haig-Thomas (1931), Galvagni (1934), Koutsaftikis (1974b), Lipscomb (1977),

Baldock & Bretherton (1981), Showler (1984), Olivier (1987b), Parker (1996), Pamperis (2009), Ghinis *et al.* (2013).

P. rapae. (Perivóli; Kérkira town; Mt. Prasúdhi; Korissíon Lagoon; Peruládhes; Kriniás; Trimódhi; Petália; Mt. Pandokrátor; Lútses; Almirós beach; Omalí; Epískepsi; Áyios Stéfanos Siníon). Previously also recorded by Staudinger (1870), Norris (1891), Fletcher (1901), Rebel (1910), Graves (1926b), Haig-Thomas (1931), Galvagni (1934), Lipscomb (1977), Baldock & Bretherton (1981, as *Artogeia rapae*), McLean (1983, as *Artogeia rapae*), Showler (1984, as *Artogeia rapae*), Olivier (1987b), Withrington (1995), Parker (1996), Pamperis (2009), Ghinis *et al.* (2013).

Pieris napi (Linnaeus, 1758). (Mt. Prasúdhi; Mt. Pandokrátor). Previously also recorded by Baldock & Bretherton (1981, as *Artogeia napi*), Parker (1996), Tolman (1997, as *Artogeia napi*), Pamperis (2009), Ghinis *et al.* (2013).

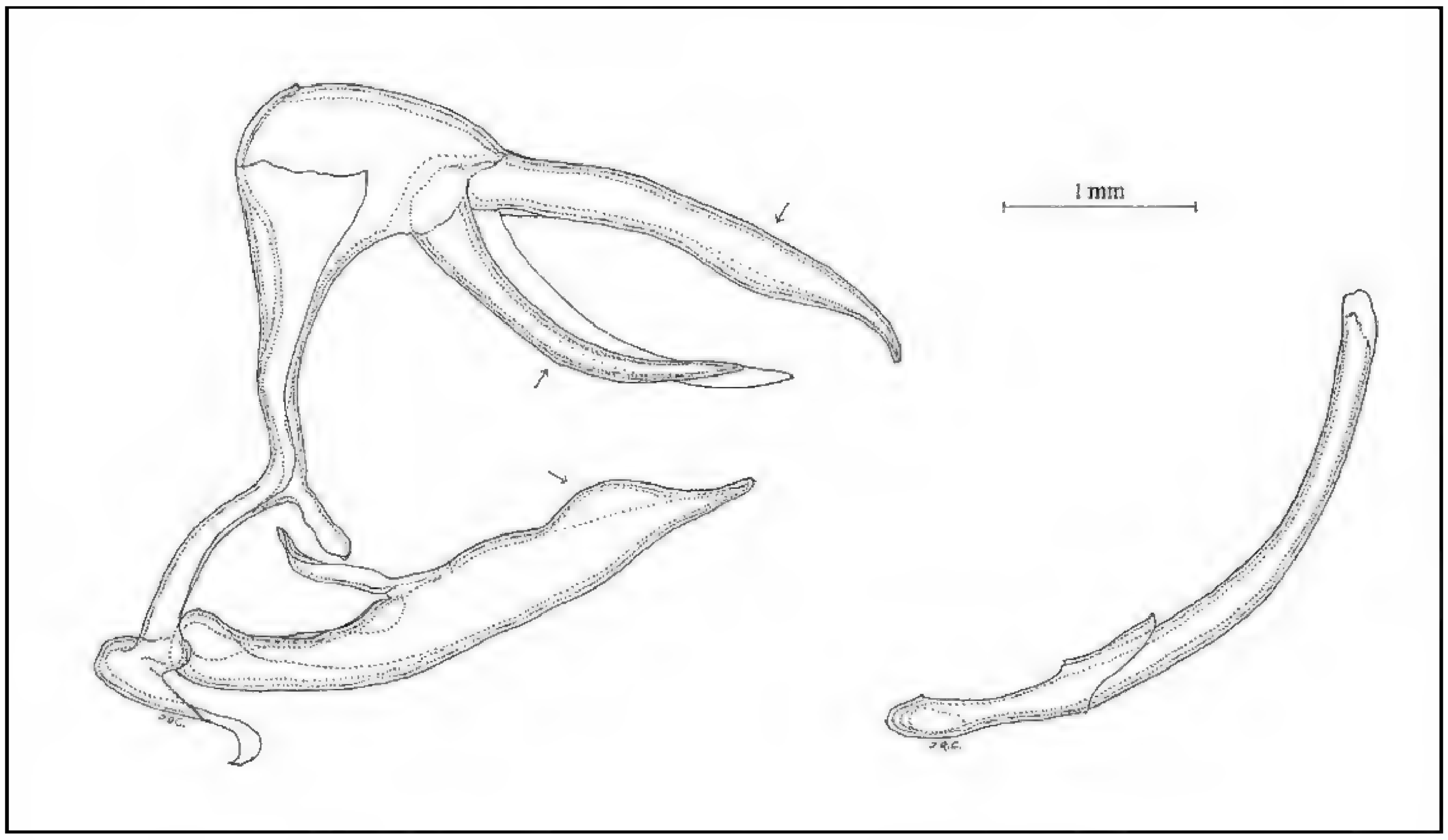

Fig. 5. Male genitalia of *Hipparchia volgensis* (Mazochin-Porshnjakov, 1952). Greece, Kérkira Island, Trimódhi, 450 m, 10.vii.2016. Prep. no. 5709.

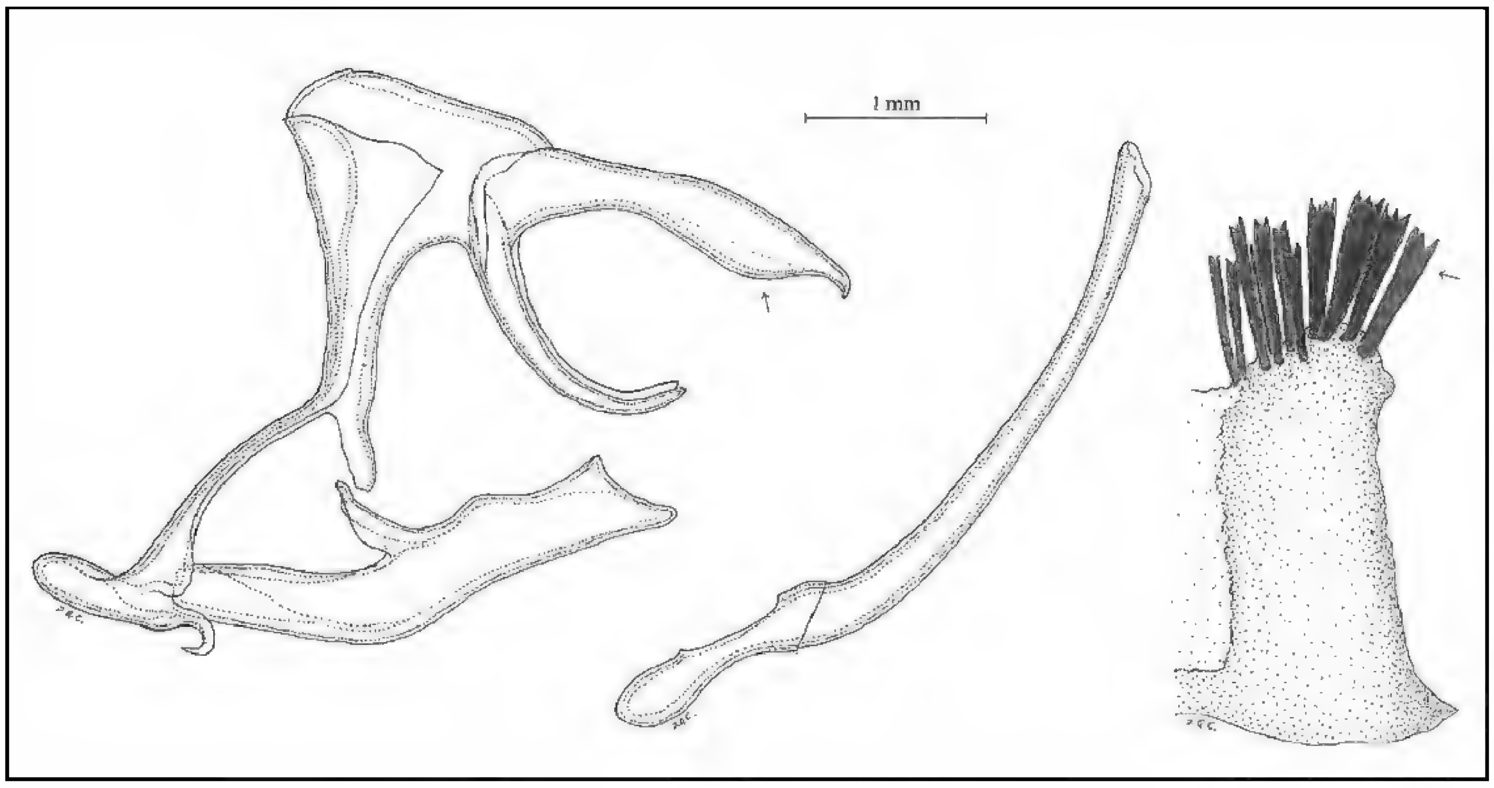

Fig. 6. Male genitalia of *Hipparchia syriaca* (Staudinger, 1871). Greece, Kérkira Island, Lútses, 240 m, 13.vii.2016. Prep. no. 5711.

P. edusa. (Mt. Prasúdhi; Mt. Pandokrátor; Mt. Pandokrátor, N. side; Almirós beach). Previously also recorded by Norris (1891, as *Pieris daplidice* (Linnaeus, 1758)), Mathew (1898, as *Pieris daplidice*), de la Garde (1899, as *Pieris daplidice*), Rebel (1910, as *Pieris daplidice*), Graves (1926b, as *Pontia daplidice*), Galvagni (1934, as *Pieris daplidice*), Lipscomb (1977, as *Pontia daplidice*), Baldock & Bretherton (1981, as *Pontia daplidice*), Olivier (1987b, as *Pontia daplidice*), Withrington (1995, as *Pontia daplidice*), Parker (1996), Pamperis (2009), Ghinis *et al.* (2013).

C. croceus. (Perivóli; Mt. Prasúdhi; Korissíon Lagoon; Peruládhes; Trimódhi; Petália; Mt. Pandokrátor; Almirós beach; Nímfes; Omalí; Epískepsi). Previously also recorded by Norris (1891, as *Colias edusa* (Fabricius, 1787), Mathew (1898, as *Colias edusa*), Fletcher (1901, as *Eurymus* (*Colias*) *edusa*), Rebel (1912, as *Colias edusa*), Graves (1926b), Haig-Thomas (1931), Galvagni (1934), Lipscomb (1977), Baldock & Bretherton (1981, as *Colias crocea*), Showler (1984), Olivier (1987b, as *Colias crocea*), Köstler (1991, as *Colias crocea*), Vanholder (1993, as *Colias crocea*), Parker (1996, as *Colias crocea*), Pamperis (2009, as *Colias crocea*), Ghinis *et al.* (2013, as *Colias crocea*).

G. cleopatra. (Perivóli; Kérkira town; Mt. Prasúdhi; Peruládhes; Kriniás; Trimódhi; Petália; Mt. Pandokrátor; Mt. Pandokrátor, N. side; Almirós beach; Nímfes; Omalí; Epískepsi; Áyios Stéfanos Sinίon). Previously also recorded by Norris (1891, as *Gonopteryx cleopatra*), Mathew (1898, as *Rhodocera cleopatra*), Rebel (1910, 1912, in first instance as *Gonopteryx cleopatra*), Graves (1926b), Haig-Thomas (1931), Galvagni (1934, 1935), Lipscomb (1977), Baldock & Bretherton (1981), McLean (1983), Showler (1984), Köstler (1991), Parker (1996), Tolman (1997), Pamperis (2009), Ghinis *et al*. (2013).

Favonius quercus (Linnaeus, 1758). (Mt. Pandokrátor). Previously also recorded by Parker (1996, as *Quercusia quercus*, and as an as yet unpublished record by Peter Taylor), Pamperis (2009, as *Neozephyrus quercus*), Ghinis *et al*. (2013, as *Quercusia quercus*).

Satyrium ilicis (Esper, [1779]). (Petália). Previously also recorded by Staudinger (1870, as *Thecla ilicis*), Norris (1891, as *Thecla ilicis*), Baldock & Bretherton (1981, as *Nordmannia ilicis*), Olivier (1987b), Parker (1996), Tolman (1997), Pamperis (2009), Ghinis *et al*. (2013).

L. phlaeas. (Lútses). Previously also recorded by Norris (1891, as *Polyommatus phlaeas*), Mathew (1898, as *Polyommatus phlaeas*), Fletcher (1901, as *Chrysophanus phlaeas*), Rebel (1912, as *Chrysophanus phlaeas*), Graves (1926b, as *Heodes* (*Rumicia*) *phlaeas*), Galvagni (1935, as *Chrysophanus phlaeas*), Lipscomb (1977), Baldock & Bretherton (1981), Showler (1984), Parker (1996), Pamperis (2009), Ghinis *et al*. (2013).

L. boeticus. (Perivóli; Mt. Prasúdhi; Peruládhes; Trimódhi; Petália; Mt. Pandokrátor; Almirós beach). Previously also recorded by Graves (1926b), Baldock & Bretherton (1981), Showler (1984), Withrington (1995), Parker (1996), Pamperis (2009), Ghinis *et al*. (2013).

L. pirithous. (Perivóli). Previously also recorded by Mathew (1898, as *Lycaena telicanus*), de la Garde (1899, as *Lycaena telicanus* (Lang, 1789)), Graves (1926b, as *Syntarucus telicanus*), Baldock & Bretherton (1981, as *Syntarucus pirithous*), Köstler (1991, as *Synt*[*a*]*rucus pirithous*), Withrington (1995, as *Syntarucus pirithous*), Parker (1996), Pamperis (2009), Ghinis *et al*. (2013).

Cacyreus marshalli Butler, 1898. (Lútses; Almirós beach; Áyios Stéfanos Siníon). Previously also recorded by Pamperis (2009), Ghinis *et al*. (2013).

C. argiolus. (Trimódhi; Mt. Pandokrátor). Previously also recorded by Norris (1891, as *Lycaena argiolus*), Mathew (1898, as *Lycaena argiolus*), Rebel (1910, as *Lycaena argiolus*), Graves (1926b, as *Lycaenesthes argiolus*), Baldock & Bretherton (1981), Olivier (1987b), Withrington (1995), Parker (1996), Pamperis (2009), Ghinis *et al*. (2013).

Plebejus argus (Linnaeus, 1758). (Mt. Pandokrátor). Previously also recorded by Staudinger (1870, as both *Lycaena argus* and *Lycaena aegon* [Denis & Schiffermüller], 1775), Rebel (1912, as *Lycaena argus*), Graves (1926b), Baldock & Bretherton (1981), Parker (1996), Tolman (1997), Pamperis (2009), Ghinis *et al.* (2013; [in our estimation the two accompanying colour figures represent *P. icarus*]).

A. agestis. (Mt. Prasúdhi). Previously also recorded by Rebel (1912, as *Lycaena astrarche*), Graves (1926b, as *Plebeius medon*), Haig-Thomas (1931, as *Polyommatus medon*), Baldock & Bretherton (1981), McLean (1983), Olivier (1987a), Withrington (1995), Parker (1996), Pamperis (2009), Ghinis *et al*. (2013).

P. icarus. (Perivóli; Kérkira town; Korissíon Lagoon; Trimódhi; Petália; Mt. Pandokrátor, N. side; Lútses; Almirós beach). Previously also recorded by Staudinger (1891, as *Lycaena argus* Poda, 1761), de la Garde (1899, as *Lycaena icarus*), Fletcher (1901), Rebel (1910, 1912, in both instances as *Lycaena icarus*), Graves (1926b), Haig-Thomas (1931), Galvagni (1935, as *Lycaena icarus*), Baldock & Bretherton (1981), McLean (1983), Showler (1984), Olivier (1987a, b), Withrington (1995), Parker (1996), Pamperis (2009), Ghinis. (2013).

Melanargia larissa (Geyer, [1828]). (Mt. Prasúdhi; Trimódhi; Petália; Mt. Pandokrátor; Mt. Pandokrátor, N. side; Epískepsi). Previously also recorded by Staudinger (1870), Norris (1891), de la Garde (1899), Rebel (1910), Graves (1926a,b, in the former instance as *Agapetes larissa*), Haig-Thomas (1931), Baldock & Bretherton (1981), Olivier (1987b,c), Köstler (1991), Parker (1996), Tolman (1997), Pamperis (2009), Ghinis *et al*. (2013).

M. jurtina. (Perivóli; Lútses; Nímfes). Previously also recorded by Norris (1891, as *Epinephele janira*), Mathew (1898, as *Epinephele ianira*), de la Garde (1899, as *Epinephele hispulla*), Rebel (1910, as *Epinephele jurtina*), Graves (1926a,b, 1933, in first two instances as *Epinephele jurtina*), Haig-Thomas (1931, as *Epinephele jurtina*), Graves (1933), Galvagni (1935, as *Epinephele hispulla*), Baldock & Bretherton (1981), Olivier (1987a), Withrington (1995), Parker (1996), Tolman (1997), Pamperis (2009), Ghinis *et al*. (2013).

C. pamphilus. (Perivóli; Korissíon Lagoon; Mt. Pandokrátor, N. side; Lútses; Almirós beach). Previously also recorded by Mathew (1898), de la Garde (1899), Rebel (1910, 1912), Graves (1926b), Haig-Thomas (1931), Lipscomb (1977), Baldock & Bretherton (1981), McLean (1983), Olivier (1987a, b), Withrington (1995), Parker (1996), Pamperis (2009), Ghinis *et al*. (2013).

L. megera. (Mt. Prasúdhi; Peruládhes; Trimódhi; Petália; Mt. Pandokrátor; Mt. Pandokrátor, N. side; Lútses; Nímfes; Omalí; Epískepsi; Áyios Stéfanos Siníon). Previously also recorded by Norris (1891, as *Pararge megaera*), Rebel (1910; 1912, in both instances as *Pararge megaera*), Graves (1926b, as *Pararge megera*), Haig-Thomas (1931, as *Pararge megera*), Galvagni (1935, as *Pararge megaera*), Lipscomb (1977, as *Pararge megera*), Baldock & Bretherton (1981), Showler (1984), Withrington (1995), Parker (1996), Pamperis (2009), Ghinis et al. (2013).

L. maera. (Mt. Prasúdhi). Previously also recorded by Norris (1891, as *Pararge maera*), Graves (1926b, as *Pararge maera*), Galvagni (1935, as *Pararge maera*), Baldock & Bretherton (1981), McLean (1983), Köstler (1991), Withrington (1995), Parker (1996), Pamperis (2009), Ghinis *et al*. (2013).

Kirinia roxelana (Cramer, [1777]). (Mt. Pandokrátor; Lútses; Omalí). Previously also recorded by Staudinger (1870, as *Pararge roxelana*), Norris (1891, as *Pararge roxelana*), Staudinger (1891, as *Pararg*[e] *roxelana*), Norris (1891, as *Pararge roxelana*), Mathew (1898, as *Pararge*

roxelana), de la Garde (1899, as *Satyrus* (*Pararge*) *roxelana*), Rebel (1910, as *Pararge roxelana*), Graves (1926b, as *Dira* (*Pararge*) *roxelana*), Baldock & Bretherton (1981), Olivier (1987b, c), Withrington (1995), Parker (1996), Tolman (1997), Pamperis (2009), Ghinis *et al.* (2013).

Brintesia circe (Fabricius, 1775). (Petália; Mt. Pandokrátor). Previously also recorded by Pamperis (2009), Ghinis *et al.* (2013).

Danaus chrysippus (Linnaeus, 1758). (Almirós beach). Previously also recorded by Vanholder (1993), Withrington (1995), Parker (1996), Tolman (1997), Pamperis (2009), Ghinis *et al.* (2013).

Libythea celtis (Laicharting, 1782). (Omalí). Previously also recorded by Baldock & Bretherton (1981, as needing confirmation), Parker (1996), Pamperis (2009), Ghinis *et al.* (2013).

L. reducta. (Perivóli; Mt. Prasúdhi; Mt. Pandokrátor; Lútses; Omalí). Previously also recorded by Norris (1891, as Limenitis camilla), Mathew (1898, as *Limenitis camilla*), de la Garde (1899, as *Limenitis camilla*), Rebel (1910, as *Limenitis camilla*), Graves (1926b, as *Limenitis rivularis* Stichel, [1908]), Haig-Thomas (1931, as *Limenitis camilla*), Lipscomb (1977), Baldock & Bretherton (1981), Köstler (1991), Parker (1996), Tolman (1997), Pamperis (2009), Ghinis *et al.* (2013).

Argynnis paphia (Linnaeus, 1758). (Mt. Prasúdhi; Kriniás; Trimódhi; Petália; Mt. Pandokrátor; Lútses; Nímfes; Epískepsi). Previously also recorded by Staudinger (1870), Mathew (1898), Graves (1926a,b, in both instances as *Dryas paphia*), Haig-Thomas (1931, as *Dryas paphia*), Baldock & Bretherton (1981), Vanholder (1993), Withrington (1995), Parker (1996), Pamperis (2009), Ghinis *et al.* (2013).

Argynnis pandora ([Denis & Schiffermüller], 1775). (Mt. Prasúdhi). Previously also recorded by Rebel (1910), Baldock & Bretherton (1981, as *Pandoriana pandora*), Withrington (1995), Parker (1996), Tolman (1997), Pamperis (2009).

Melitaea didyma (Esper, [1778]). (Kriniás; Lútses; Almirós beach). Previously also recorded by Norris (1891), Mathew (1898), de la Garde (1899), Rebel (1912), Graves (1926b), Haig-Thomas (1931), Galvagni (1935), Koutsaftikis (1973), Baldock & Bretherton (1981), Olivier (1987a,b,c), Köstler (1991), Parker (1996), Tolman (1997), Pamperis (2009), Ghinis *et al.* (2013).

V. atalanta. (Nímfes). Previously also recorded by Norris (1891), de la Garde (1899), Fletcher (1901, as *Pyrameis atalanta*), Rebel (1910, as *Pyrameis atalanta*), Graves (1926b, as *Pyrameis atalanta*), Haig-Thomas (1931, as *Pyrameis atalanta*), Galvagni (1935, as *Pyrameis atalanta*), Lipscomb (1977), Baldock & Bretherton (1981), McLean (1983), Showler (1984), Parker (1996), Pamperis (2009), Ghinis *et al.* (2013).

V. cardui. (Kérkira town; Mt. Prasúdhi; Peruládhes; Trimódhi; Petália; Mt. Pandokrátor; Mt. Pandokrátor, N. side; Almirós beach; Epískepsi; Áyios Stéfanos Siníon). Previously also recorded by Norris (1891), de la Garde (1899, as *Pyrameis cardui*), Fletcher (1901, as *Pyrameis cardui*), Rebel (1912, as *Pyrameis cardui*), Graves (1926b, as *Pyrameis cardui*), Haig-Thomas (1931, as *Pyrameis cardui*), Galvagni (1935, as *Pyrameis cardui*), Lipscomb (1977), Baldock & Bretherton (1981, as *Cynthia cardui*), McLean (1983, as *Cynthia cardui*), Showler (1984, as *Cynthia cardui*), Vanholder (1993), Parker (1996, as *Cynthia cardui*), Pamperis (2009), Ghinis *et al.* (2013).

P. egea. (Kérkira town; Mt. Pandokrátor; Nímfes). Previously also recorded by Staudinger (1870, as *Vanessa egea*), Norris (1891, as *Vanessa egea*), Mathew (1898 as *Vanessa egea*), de la Garde (1899, as *Vanessa egea*), Rebel (1910), Graves (1926b), Galvagni (1935), Baldock & Bretherton (1981), Köstler (1991), Withrington (1995), Parker (1996), Tolman (1997, as *Polygonum egea*), Pamperis (2009), Ghinis *et al.* (2013).

Records made exclusively by others

Reverdinus (*Reverdinus*) *orientalis* (Reverdin, 1913): Staudinger (1891, as *Spilothyrus marrubii*), Baldock & Bretherton (1981, as *Carcharodus orientalis*), Parker (1996, as *Carcharodus orientalis*), Tolman (1997, as *Carcharodus orientalis*), Embacher (2000, as *Carcharodus orientalis*), Pamperis (2009, as *Carcharodus orientalis*), Ghinis *et al.* (2013, as *Carcharodus orientalis*).

Reverdinus (*Reverdinus*) *flocciferus*: Galvagni (1935, as *Carcharodus altheae* Hübner, [1803]), Baldock & Bretherton (1981, as *Carcharodus flocciferus* and as an erroneous record), Parker (1996, as *Carcharodus flocciferus* and as an erroneous or doubtful record), Pamperis (2009, as *Carcharodus flocciferus* with a question mark). Note: most probably a misidentification of *R.* (*R.*) *orientalis* and therefore rejected by us.

Reverdinus (*Lavatheria*) *lavatherae* (Esper, [1783]): Staudinger (1870, as *Spilothyrus lavatherae*), Withrington (1995, as *Carcharodus lavatherae*), Parker (1996, as *Carcharodus lavatherae* and as an erroneous or doubtful record), Pamperis (2009, as *Carcharodus lavatherae* with a question mark). Note: we are rejecting this record, considering it as being based most probably on a misidentification of *R.* (*R.*) *orientalis*.

Erynnis tages (Linnaeus, 1758): Staudinger (1870), Baldock & Bretherton (1981, as needing confirmation), Parker (1996, as erroneous or doubtful), Tolman (1997), Pamperis (2009). Note: confirmation desirable.

Erynnis marloyi (Boisduval, [1834]): Lipscomb (1977), Baldock & Bretherton (1981), Parker (1996), Tolman (1997), Pamperis (2009).

Pyrgus malvae (Linnaeus, 1758): Galvagni (1935, as *Hesperia malvae*), McLean (1983), Parker (1996), Pamperis (2009), Ghinis *et al.* (2013).

Pyrgus armoricanus (Oberthür, 1910): Ghinis *et al.* (2013; [in our estimation the accompanying colour figure represents *P. malvae*]). Note: We are at present rejecting this record.

Spialia orbifer (Hübner, [1823]): Rebel (1910, as *Hesperia orbifer*), Baldock & Bretherton (1981), Withrington (1995), Parker (1996), Tolman (1997), Pamperis (2009), Ghinis *et al.* (2013).

T. acteon: Staudinger (1870, as *Hesperia acteon*), Norris (1891, as *Hesperia actaeon*), Rebel (1912, as *Adopaea actaeon*), Graves (1926b), Baldock & Bretherton

(1981), Parker (1996), Tolman (1997), Pamperis (2009), Ghinis *et al*. (2013).

Thymelicus lineola (Ochsenheimer, 1808): Withrington (1995), Parker (1996, as unconfirmed), Pamperis (2009, with a question mark). Note: perhaps a misidentification of *T. sylvestris*. Confirmation desirable.

O. sylvanus: Norris (1891, as *Hesperia sylvanus*), de la Garde (1899, as *Pamphila sylvanus*), Baldock & Bretherton (1981, as *Ochlodes venata* (Bremer & Grey, 1853)), Withrington (1995, as *Ochlodes venata*), Parker (1996, as *Ochlodes venatus*), Tolman (1997, as *Ochlodes venatus*), Pamperis (2009), Ghinis *et al*. (2013, as *Ochlodes venatus*).

G. pumilio: Staudinger (1870, as *Hesperia pumilio*), Baldock & Bretherton (1981), Parker (1996), Tolman (1997), Pamperis (2009), Ghinis *et al*. (2013; [in our estimation the two accompanying colour figures represent worn male *T. action*]). Note: as the genitalia were not checked, probably a misidentification of *G. nostrodamus*.

G. nostrodamus: Mathew (1898, as *Hesperia nostrodamus*), Baldock & Bretherton (1981, with a question mark), Withrington (1995), Parker (1996, as unconfirmed and as erroneous or doubtful), Pamperis (2009, with a question mark). Note: as the genitalia were not checked, possibly a misidentification of *G. pumilio*. Perhaps both the above two species exist on the island, and surely at least one of the two, but we are not sure about which of the two really is.

P. alexanor: Staudinger (1870), Norris (1891), Rebel (1910), Graves (1926b), Higgins & Riley (1980), Baldock & Bretherton (1981), Köstler (1991), Parker (1996), Tolman (1997), Pamperis (2009), Ghinis *et al*. (2013).

Z. polyxena: Staudinger (1870, as *Thais polyxena*), Rebel (1910, as *Thais polyxena cassandra*), Baldock & Bretherton (1981, as needing confirmation), Parker (1996), Pamperis (2009), Ghinis *et al.* (2013).

Pieris ergane (Geyer, [1828]): Norris (1891), Baldock & Bretherton (1981, as *Artogeia ergane* and as needing confirmation), Parker (1996 (p. 254), as a doubtful record by Norris (1891) and (p. 255), as an as yet unpublished record by Peter Taylor), Pamperis (2009).

Pieris mannii (Mayer, 1851): Parker (1996), Pamperis (2009).

Pieris krueperi Staudinger, 1860: Baldock & Bretherton (1981, as *Artogeia krueperi*), Köstler (1991), Parker (1996), Tolman (1997, as *Artogeia krueperi*), Pamperis (2009), Ghinis *et al*. (2013).

E. ausonia: Staudinger (1870, as *Anthocharis belia* (Cramer, [1782]), Norris (1891, as *Euchloe belia*, and var. *ausonia*), Graves (1926b), Haig-Thomas (1931, as *Euchloe belia*), Baldock & Bretherton (1981, as *Euchloe crameri*), Showler (1984, as *Euchloe crameri*), Olivier (1987b, as *Euchloe simplonia*), Köstler (1991), Parker (1996), Pamperis (2009), Ghinis *et al.* (2013).

Euchloe tagis (Hübner, [1804]): Norris (1891), Baldock & Bretherton (1981, as a misidentification), Parker (1996, as an erroneous or doubtful record). Note: most probably a misidentification of small individuals of *E. ausonia*, and therefore the record is rejected by us.

Anthocharis cardamines (Linnaeus, 1758): Staudinger (1870), Rebel (1910, as *Euchloë cardamines*), Graves (1926b), Baldock & Bretherton (1981), McLean (1983), Showler (1984), Olivier (1987b), Parker (1996), Tolman (1997), Pamperis (2009), Ghinis *et al*. (2013).

Anthocharis damone Boisduval, 1836: Showler (1984, as a highly possible record), Tolman & Bernhard (1994), Parker (1996), Tolman (1997), Pamperis (2009), Ghinis *et al*. (2013).

Colias alfacariensis Ribbe, 1905: Koutsaftikis (1974b, as *Colias australis* Verity, 1911), Parker (1996, as an erroneous or doubtful record), Pamperis (2009), Ghinis *et al*. (2013; [in our estimation the two accompanying colour figures represent the white morph of female *C. croceus*]). Note: we agree with Parker, considering the record as a probable misidentification of the yellowish or whitish morph of female *C. croceus*. Record rejected by us.

G. rhamni: Norris (1891, as *Gonopter*[*y*]*x rhamni*), Haig-Thomas (1931), Baldock & Bretherton (1981), Parker (1996), Tolman (1997), Pamperis (2009), Ghinis et al. (2013; [in our estimation the two accompanying colour figures represent female *G. cleopatra*]).

L. duponcheli: Koutsaftikis (1974b), Parker (1996, as erroneous or doubtful), Pamperis (2009, with a question mark), Ghinis *et al.* (2013; [in our estimation the two accompanying colour figures represent *L. sinapis*]). Note: we agree with Parker, considering the record as a misidentification of *L. sinapis* and therefore rejected by us.

C. rubi: Norris (1891, as *Thecla rubi*), Graves (1926b), Lipscomb (1977), Baldock & Bretherton (1981), McLean (1983), Showler (1984), Parker (1996), Pamperis (2009), Ghinis *et al*. (2013).

Satyrium acaciae (Fabricius, 1787): Köstler (1991, as *Nordmannia acaciae*), Pamperis (2009). Note: we consider this record as rather doubtful, and as a probable misidentification of *S. ilicis*.

S. spini: Staudinger (1870, as *Thecla spini*), Baldock & Bretherton (1981, as *Strimonidia spini*), Parker (1996), Tolman (1997), Pamperis (2009).

Satyrium w-album (Knoch, 1782): de la Garde (1899, as *Strymon w-album*), Baldock & Bretherton (1981, as *Strymonidia w-album* and as doubtful), Parker (1996, as an erroneous or doubtful record), Pamperis (2009, with a question mark), Ghinis *et al*. (2013, including a very clear and definable colour slide of the butterfly's underside).

Lycaena alciphron (Rottemburg, 1775): Norris (1891, as *Polyommatus alciphron*), Baldock & Bretherton (1981, as *Heodes alciphron* and as doubtful), Parker (1996), Pamperis (2009).

Lycaena ottomana (Lefebvre, 1830): Parker (1996), Tolman (1997), Pamperis (2009), Ghinis *et al*. (2013).

Lycaena thersamon Esper, [1784]: Parker (1996, as an as yet unpublished record by Peter Taylor), Pamperis (2009).

Tarucus balkanicus (Freyer, [1844]): Willemse (1981), Baldock & Bretherton (1981), Parker (1996), Tolman (1997), Pamperis (2009).

Cupido minimus (Fuessly, 1775): Norris (1891, as *Lycaena minimus*), Graves (1926b), Baldock & Bretherton (1981), Parker (1996), Tolman (1997), Pamperis (2009), Ghinis *et al.* (2013; in our estimation the two accompanying colour figures represent female *C. semiargus*).

Cupido osiris (Meigen, [1829]): Ghinis *et al.* (2013; [in our estimation the two accompanying colour figures represent male *C. semiargus*]). Note: Confirmation desirable.

G. alexis: Fletcher (1901, as *Nomiades cyllarus*), Graves (1926b, as *Glaucopsyche cyllarus*), Galvagni (1935, as *Lycaena cyllarus*), Lipscomb (1977), Baldock & Bretherton (1981), McLean (1983), Showler (1984), Parker (1996), Tolman (1997), Pamperis (2009), Ghinis *et al.* (2013).

Glaucopsyche melanops (Boisduval, [1828]): Norris (1891, as *Lycaena melanops*), Baldock & Bretherton (1981, as a rejected record), Parker (1996, as a rejected record). Note: likewise record rejected by us and considered instead as a misidentification of *G. alexis*.

P. vicrama: Staudinger (1870, as *Lycaena hylas* ([Denis & Schiffermüller], 1775)), Fletcher (1901, as *Plebeius baton*), Rebel (1910, as *Lycaena baton*), Graves (1926b, as *Scolitantides baton*), Haig-Thomas (1931, as *Scolitantides vicrama*), Baldock & Bretherton (1981, as *Pseudophilotes baton*), McLean (1983, as *Pseudophilotes baton*), Parker (1996), Tolman (1997), Pamperis (2009), Ghinis *et al.* (2013).

Scolitantides orion (Pallas, 1771): Staudinger (1870, as *Lycaena battus* (Denis & Schiffermüller, 1775)). Note: we are rejecting this record and consider it as having probably been the result of mislabeling.

Freyeria trochylus (Freyer, [1845]): Pamperis (2009, as *Chilades trochylus*). Note: confirmation desirable.

Lycaeides idas (Linnaeus, 1761): Baldock & Bretherton (1981, as needing confirmation), Pamperis (2009, with a question mark). Note: record rejected by us.

Cyaniris semiargus (Rottemburg, 1775): Pamperis (2009), Ghinis *et al.* (2013).

Polyommatus thersites (Cantener, [1835]): Graves (1926a, b), Baldock & Breth-erton (1981, as *Agrodiaetus thersites*), Withrington (1995, as *A*[*grodiaetus*] *thersites*), Parker (1996), Pamperis (2009).

Melanargia galathea (Linnaeus, 1758): Pamperis (2009). Note: confirmation desirable.

H. fagi: Norris (1891, as *Satyrus hermione*), Mathew (1898, as *Satyrus hermione*), Rebel (1910, as *Satyrus hermione*), Baldock & Bretherton (1981, as needing confirmation and probably referable to *H. syriaca*), Parker (1996, as probably referable to *H. syriaca*), Tolman (1997), Pamperis (2009). Note: within all probability in all cases a misidentification of *H. syriaca*, though the existence of *H. fagi* on the island cannot be completely ruled out. See also under *H. syriaca*.

H. semele: Norris (1891, as *Satyrus semele*), Rebel (1910, as *Satyrus semele*), Graves (1926a,b), Haig-Thomas (1931), Galvagni (1935, as *Satyrus semele*), Koutsaftikis (1974), Baldock & Bretherton (1981, as doubtful), Köstler (1991), Withrington (1995), Parker (1996). Note: this record is being rejected by us, being most probably a misidentification of *H. volgensis*. See also under *H. volgensis*.

H. senthes: Mathew (1898, as *Satyrus semele* var. *aristaeus* (Bonelli, 1826)), de la Garde (1899, as *Satyrus semele* var. *aristaeus*), Baldock & Bretherton (1981, as *Hipparchia aristaeus* and as a possibly valid record), Withrington (1995, as *Hipparchia aristaeus*), Pamperis (2009), Ghinis *et al.* (2013, as *Hipparchia aristaeus*). Note: in our estimation a doubtful record not based on genitalia characters and not supported by our own finds. See also under *H. volgensis*.

Hipparchia statilinus (Hufnagel, 1766): Baldock & Bretherton (1981, as *Neohipparchia statilinus*), Parker (1996), Tolman (1997, as *Neohipparchia statilinus*), Pamperis (2009).

Hyponephele lupina (Costa, [1836]): Parker (1996), Pamperis (2009).

Hyponephele lycaon (Rottemburg, 1775): Pamperis (2009, with a question mark). Note: confirmation desirable.

Pyronia cecilia (Vallantin, 1894): Norris (1891, as *Epinephele ida* (Esper, 1784)), Mathew (1898, as *Epinephele ida*), Rebel (1910, 1912, in both instances as *Epinephile ida*), Graves (1926b, as *Pyronia* (*Epinephele*) *ida*), Haig-Thomas (1931, as *Epinephele ida*), Lipscomb (1977), Baldock & Bretherton (1981), Parker (1996), Tolman (1997), Pamperis (2009).

P. aegeria: Norris (1891, as *Pararge egeria*), Mathew (1898, as *Pararge egeria*), Rebel (1910, 1912), Graves (1926b, as *Pararge aegeria*), Haig-Thomas (1931, as *Pararge aegeria*), Lipscomb (1977), Baldock & Bretherton (1981), McLean (1983), Showler (1984), Withrington (1995), Parker (1996), Pamperis (2009), Ghinis *et al.* (2013).

C. jasius: Norris (1891), Baldock & Bretherton (1981), Vanholder (1993), Withrington (1995), Parker (1996), Tolman (1997), Pamperis (2009), Ghinis *et al.* (2013).

Limenitis camilla: Norris (1891), Mathew (1898), de la Garde (1899), Rebel (1910), Haig-Thomas (1931). Note: this record is being rejected by us, as actually referring to *L. reducta* on account of nomenclatural mix-ups (see under *L. reducta*).

Neptis rivularis (Scopoli, 1763): Withrington (1995), Parker (1996, as unconfirmed). Note: in our estimation the record should be outright rejected. In Greece found only in the Rodhópi Mts., in dense deciduous or mixed forest, near the border with Bulgaria, and at considerable heights (Coutsis & Ghavalas, 1988). The record most probably refers to a misidentified *L. reducta*.

Nymphalis polychloros (Linnaeus, 1758): Norris (1891, as *Vanessa polychloros*), Lipscomb (1977), Baldock & Bretherton (1981), Showler (1984), Parker (1996), Tolman (1997), Pamperis (2009), Ghinis *et al.* (2013).

Nymphalis antiopa (Linnaeus, 1758): Norris (1891, as *Vanessa antiopa*), Lipscomb (1977), Baldock & Bretherton (1981), Showler (1984), Parker (1996), Pamperis (2009), Ghinis *et al.* (2013).

Inachis io (Linnaeus, 1758): Staudinger (1870, as *Vanessa io*), Norris (1891, as *Vanessa io*), Galvagni (1935, as *Vanessa io*), Koutsaftikis (1973), Baldock & Bretherton (1981), Parker (1996), Tolman (1997), Pamperis (2009), Ghinis *et al.* (2013).

Aglais urticae (Linnaeus, 1758): Norris (1891, as *Vanessa urticae*), Baldock & Bretherton (1981), Parker (1996), Pamperis (2009).

Polygonia c-album (Linnaeus, 1758): de la Garde (1899, as *Vanessa c-album*), Baldock & Bretherton (1981),

Parker (1996), Tolman (1997, as *Polygonum c-album*), Pamperis (2009), Ghinis *et al*. (2013).

Argynnis adippe (Denis & Schiffermüller, 1775): Koutsaftikis (1973, as *Fabriciana adippe*), Baldock & Bretherton (1981, as doubtful), Pamperis (2009, with a question mark). Note: Most probably an erroneous record.

Issoria lathonia (Linnaeus, 1758): Staudinger (1870, as *Argynnis lathonia*), Baldock & Bretherton (1981, as doubtful), Parker (1996), Pamperis (2009). Note: probable as an autumn vagrant, but needing confirmation.

Melitaea cinxia (Linnaeus, 1758): Norris (1891), Graves (1926b), Lipscomb (1977), Baldock & Bretherton (1981), Parker (1996), Tolman (1997), Pamperis (2009), Ghinis *et al*. (2013).

Melitaea phoebe (Denis & Schiffermüller, 1775): Norris (1891), Baldock & Bretherton (1981), Parker (1996), Pamperis (2009). Note: probably a misidentification of *Melitaea telona* Fruhstorfer, 1908 and therefore confirmation of record desirable.

Melitaea trivia (Denis & Schiffermüller, 1775): Staudinger (1870), Pamperis (2009, with a question mark). Note: confirmation desirable.

Discussion

Judging from the number of available references it becomes evident that Kérkira is the island exhibiting far greater lepidopterological activity than does Zákinthos. As a result of this the butterfly fauna of the former is pretty well known in its near entirety, whilst that of the latter is in need of further research.

Omitting the species whose records we have outright rejected, as well as the ones for which we feel that their records should be confirmed, we have calculated that the number of known, combined skippers and butterflies for Zákinthos is 35, and for Kérkira 78. Of all the ones accepted for Kérkira, a few, like for instance *N. antiopa*, *I. io* and *A. urticae*, are probably autumn vagrants that leave their home-grounds in Mainland Greece in order to avoid the first signs of cold weather. This is a phenomenon that we have personally repeatedly observed in other places in Greece as well.

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Een intergenerische paring van dagvlinders (Lepidoptera: Nymphalidae, Satyrinae)

Sylvain Cuvelier, Jan Pauwels en Omer Van de Kerckhove

Samenvatting. Recent werd in Aalter (België, Oost-Vlaanderen) een intergenerische paring van een ♂ *Maniola jurtina* (Linnaeus, 1758) met een ♀ *Aphantopus hyperantus* (Linnaeus, 1758) waargenomen.

Résumé. Récemment un accouplement intergénérique entre un ♂ *Maniola jurtina* (Linnaeus, 1758) et une ♀ *Aphantopus hyperantus* (Linnaeus, 1758) a été observé à Aalter (Belgique, Flandre orientale).

Summary. Recently an intergeneric pairing between a ♂ *Maniola jurtina* and a ♀ *Aphantopus hyperantus* (Linnaeus, 1758) was observed in Aalter (Belgium, East Flanders).

Key words: intergeneric pairing – *Maniola jurtina* – *Aphantopus hyperantus*.

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Intergenerische paringen zijn uiterst zeldzaam en *Maniola jurtina* (Linnaeus, 1758) is één van de soorten waarbij dit het meest gedocumenteerd is (Coutsis & Pamperis 2012, Pamperis 2012, Russell 2013a, b).

Op 13.vi.2017 fotografeerde Jan Pauwels een intergenerische paring (Fig. 1) van een ♂ *M. jurtina* met een ♀ *Aphantopus hyperantus* (Linnaeus, 1758) op de kanaalberm (Fig. 2) in Aalter (België, Oost-Vlaanderen, 51.11N 3.42E).

Fig. 1. Copula tussen ♂ *Maniola jurtina* en ♀ *Aphantopus hyperantus*, Aalter, 13.vi.2017. Fig. 2. Biotoop te Aalter. © J. Pauwels.

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Description of a new individual form of *Carabus* (*Chrysocarabus*) *auronitens* ssp. *auronitens* (Coleoptera: Carabidae)

Ief (Yves) Peeters

Abstract. The author describes a new individual form of *Carabus* (*Chrysocarabus*) *auronitens* ssp. *auronitens* and gives some particularities about the polychromatic character of the species as well as the habitat.

Samenvatting. De auteur beschrijft een nieuwe individuele vorm van *Carabus* (*Chrysocarabus*) *auronitens* ssp. *auronitens* en geeft informatie over het polychromatisme bij deze soort en over het habitat.

Résumé. L'auteur décrit une nouvelle forme individuelle de *Carabus* (*Chrysocarabus*) *auronitens* ssp. *auronitens*, et donne quelques particularités concernant le polychromatisme de l'espèce ainsi que des informations sur le biotope.

Keywords: *Carabus* – *auronitens* – individual form – Belgium.

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In Belgium, *C.* (*Chrysocarabus*) *auronitens* Fabricius, 1972 is distributed in the forested areas in the S. and E., usually to areas 200 m. above sea level (Turin *et al*. 2003). On the Flemish Red List *C.* (*Chrysocarabus*) *auronitens* is marked as 'rare', and since 1980 it is protected by law (Desender *et al*. 2008). In the Walloon region it is not protected. The species is a rather remarkable one due to the polychromatic range of individuals, whether partially or complete. Within the area of distribution almost all subspecies of *C. auronitens* present an enormous range of chromatic tendencies. These aberrations are the result of genetic combinations, caused by inbreeding, as well as geographical and meteorological conditions. Even to this moment new individual forms get discovered and described, thus contributing to the knowledge, taxonomy as well as mutual understanding between carabologists and entomologists worldwide.

Fig. 1. Felling of trees in the region of Neupré, Belgium in June 2016, © I. Peeters.

In Belgium there are two populations which show a high tendency towards hyperchromatism[1], melanisation[2] and hypochromatism[3]: The Fôret de Soignes (Dutch: Zoniënwoud) near Brussels and the eastern region of Neupré, near Liège. In certain areas of the Fôret de Soignes, the holomelanistic form *putzeysi* Mors, 1843 can locally sometimes be very abundant (up to 20%), but on average numbers reach about 7%. One early hypothesis stated that the melanisation with putzeysi is the result of an interruption in the chromatic process (Radisic 1979). However, backcrossing experiments have clearly shown that melanisation is the result of a genetic deviation, since *putzeysi* × *putzeysi* = 100% *putzeysi*. Crossbreeding *auronitens* × *putzeysi* resulted in 100% *auronitens* in the first generation. Crossing those same individuals yielded 25% of *putzeysi*. This is conclusive evidence of the recessive character (Maguerre *et al.* 2012). Hyperchromatic forms such as *ignifer* Haury, 1889 and *aureopurpureus* Lapouge, 1898 are much rarer in this forest, and in some years almost to even completely absent (Maguerre *et al*. 2012). In 2010 I discovered there one hypochromatic specimen (f. *coerulescens* Letzner, 1850) and according to Damien Maguerre these hypochromatic forms are exceptionally rare in that locality (personal communication, December 2017).

Fig. 2. *C.* (*Chrysocarabus*) *auronitens* f. *spinolatus* © I. Peeters.

In the region of Neupré, *C. auronitens* is dispersed in a limited amount of smaller, isolated forests. Some of these

[1] hyperchromatism: excessive pigmentation, ranging from slighty coppery red to an almost dark purple.

[2] melanisation: the production, accumulation, or deposition of melanin resulting in a black(ish) colour. Two different variations, e.g. holomelanisation (head, pronotum and elytra are very darkened) and hemimelanisation (head and pronotum keep the colour of the species typica, elytra very darkened).

[3] hypochromatism: lack of red colour pigmentation, resulting in forms that vary between a bright, metallic green and blue.

woodlands are not larger than a couple of hectares. They are cut off from each other by habitation, roads, fields or farmlands. Almost all of these smaller forests are private property, and most of them are being exploited for hunting purposes and firewood. Over the course of a few years I have witnessed acres of trees being felled, thus decreasing the habitat year by year (fig. 1). Some of these woods are very atypical, yet suitable, habitats for *C. auronitens*, a species which normally prefers shady forests with a domination of beech (*Fagus sylvatica*).

Some locations in the Neupré region have a total lack of beech trees, instead housing fields of stinging nettles (*Urtica*) under poplars (*Populus*), spruces (*Picea*) and hawthorn (*Crataegus*) (Henderickx 1998). *C. auronitens* strongly depends on a moist habitat, and the felling of the trees will result, as a direct consequence, in a dryer habitat. This fragmentation seems to be both the destroyer and the midwife of the high polychromatic variety in the present populations of *C. auronitens* for which the region is known; the restricted habitats cause inbreeding and introgression. *C. auronitens* shows an extreme genetic variability over the isolated (relict?) populations (Turin *et al.* 2003). As stated before, in the long run these small woods will disappear, and with them, the ground beetles and other wildlife. Even though some literature does mention *C. auronitens* as a species with a good power of dispersal (Turin *et al.* 2003), I have found this species to be missing from an (in theory) very suitable habitat in a contiguous, large forest.

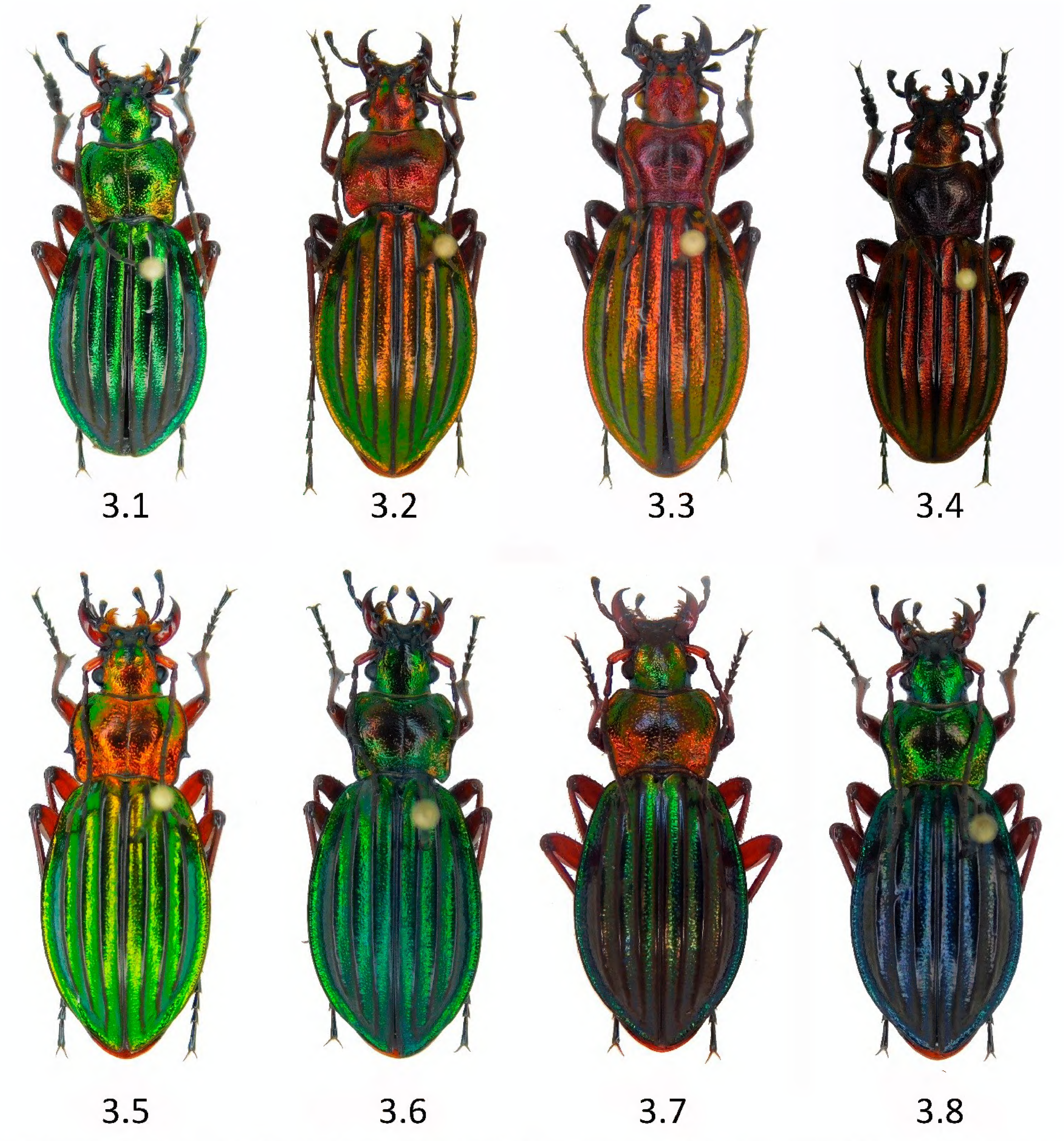

Fig. 3. Some individual forms of *C.* (*Chrysocarabus*) *auronitens* from the Neupré region - Fig. 3.1 f. *perviridis* Reitter, 1896, fig. 3.2 f. *ignifer* Haury, 1889, fig. 3.3 f. *aureopurpureus* Lapouge, 1898, fig. 3.4 f. *novi-prati* Maquet, 1991, fig. 3.5 f. *spinolatus* Maquet, 1999, figs 3.6 & 3.7 f. *atronitens* Henderickx, 1998, fig. 3.8 f. *coerulescens* Letzner, 1850. © I. Peeters.

In Neupré the occurring individual forms include, amongst others, f. *perviridis* Reitter, 1896 (fig. 3.1), f. *ignifer* Haury, 1889 (fig. 3.2), f. *aureopurpureus* Lapouge, 1898 (fig. 3.3), f. *novi-prati* Maquet, 1991 (fig. 3.4), f. *atronitens* Henderickx, 1998 (figs 3.6 & 3.7), and f. *coerulescens* Letzner, 1850 (fig. 3.8). The best known example is the very rare individual form *spinolatus* Maquet, 1999 (figs 2 & 3.5), with the very distinct bilateral (sometimes unilateral) protuberances on the thorax. Furthermore, crossbreeding experiments proved that the dark purple-garnet colour of *novi-prati* also has a genetic recessive character (Maquet 1991).

During the month of June of 2016, I discovered a specimen of *C. auronitens* of which I considered, at first sight, as a 'normal' hyperchromatic variation. During a second glance, in full daylight, it was noticeable that the insect lacked the reddish shine of f. *ignifer* and f. *aureopurpureus*, and wasn't near as dark purple-garnet as f. *novi-prati*. The elytra displayed an overall olive light brown, golden metallic shine, and a greenish brown rim at the sides. The thorax displayed a luminous coppery golden shine, also darker than the typical species. All other features are similar to the typical *C. auronitens* morphology. The only individual form that comes the closest in colour to the one I found in Neupré is f. *pallens* Lapouge, 1924, an individual form of *C.* (*Chrysocarabus*) *splendens* Olivier, 1790. F. *pallens* was described by Lapouge as 'laiton pale': pale golden (Maguerre 2004). To my best of knowledge, no such colour aberration has been described for *C. auronitens* yet, so I will name this form *rensoni*, after my good friend, colleague and mentor Bruno Renson. Together with Bruno, whom I have known for 20 years, I have spent many great moments in forests, woodlands, meadows and marshes, in the search and study of ground beetles.

Carabus (***Chrysocarabus***) ***auronitens auronitens*** f. ***rensoni*** **nova** (fig.4)

Holotype ♂: 22 mm, Belgium, Neupré region, vi.2016, leg. & coll. Peeters.

Fig. 4. *Carabus* (*Chrysocarabus*) *auronitens auronitens* f. *rensoni* **nova**. © I. Peeters.

Holotype ♂: 22 mm, Belgium, Neupré region (Liège), vi.2016, leg. & coll. Peeters. During the month of June 2016, I discovered an *auronitens* of which I thought of, at first sight, as a 'normal' hyperchromatic variation. During a second glance, in full daylight, it was noticeable that it lacked the red shine of f. *ignifer* and f. *aureopurpureus*, and wasn't near as dark maroon as f. *novi-prati*. The elytra display an overall olive light brown, golden metallic shine, and a greenish brown rim at the sides. The thorax displays a luminous coppery golden shine. All other features are similar to the typical auronitens morphology. The only individual form that comes the closest in colour to the one I found in Neupré is f. *pallens* (*Carabus* (*Chrysocarabus*) *splendens* Lapouge, 1924). F. *pallens* was described by Lapouge as 'laiton pale': pale golden. To my best of knowledge, no such colour aberration has been described yet, so I will name this form *rensoni*, after my good friend, colleague and mentor Bruno Renson, with whom I have spent many moments in forests, woodlands, meadows and marshes, searching for ground beetles.

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